Mirage M Series

SETUP GUIDE

020-100592-02

CHRISTIE®

Mirage M Series

NOTICES

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REGULATORY

The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

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The product is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

Canadian manufacturing facility is ISO 9001 and 14001 certified.

GENERAL WARRANTY STATEMENTS

For complete information about Christie's limited warranty, please contact your Christie dealer. In addition to the other limitations that may be specified in Christie's limited warranty, the warranty does not cover:

a. Damage occurring during shipment, in either direction.
b. Projector lamps (See Christie's separate lamp program policy).
c. Damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp supplied by a supplier other than Christie.
d. Problems caused by combination of the product with non-Christie equipment, such as distribution systems, cameras, video tape recorders, etc., or use of the product with any non-Christie interface device.
e. Damage caused by misuse, improper power source, accident, fire, flood, lightening, earthquake or other natural disaster.
f. Damage caused by improper installation/alignment, or by product modification, if by other than a Christie authorized repair service provider.
g. For LCD projectors, the warranty period specified applies only where the LCD projector is in "normal use." "Normal use" means the LCD projector is not used more than 8 hours a day, 5 days a week. For any LCD projector where "normal use" is exceeded, warranty coverage under this warranty terminates after 6000 hours of operation.
h. Failure due to normal wear and tear.

PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Please see the Maintenance section for specific maintenance items as they relate to your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.

1: Introduction

2: Installation and Setup

3: Operation

4: Maintenance

5: Troubleshooting

6: Specifications

A: GPIO

1 Introduction

Every effort has been made to ensure the information in this document is accurate and reliable; however, due to constant research the information in this document is subject to change without notice.

1.1 Purchase Record and Service Contacts

Whether the projector is under warranty or the warranty has expired, Christie's highly trained and extensive factory and dealer service network is always available to quickly diagnose and correct projector malfunctions. Complete service manuals and updates are available for all projectors. Should a problem be encountered with any part of the projector, contact your dealer. In most cases, servicing is performed on site. If you have purchased the projector, fill out the information below and keep with your records.

Table 1.1

Dealer:	
Dealer or Christie Sales/Service Contact Phone Number:	
Projector Serial Number*:	
Purchase Date:	
Installation Date:	

* The serial number can be found on the license label located on the back of the projector.

Table 1.2 Ethernet Settings

Default Gateway:	
DNS Server:	
Projector DLP Address:	
Projector Mgmt IP Address:	
Subnet Mask:	

1.1.1 List of Components

Ensure the following components were received with the projector:

❒ Projector with Built-In Keypad (LCD status display)

❒ IR remote keypad (includes two, 1.5V AA batteries and an XLR to mini-stereo cable conversion to wired)

❒ Line cord

❒ Lens Mount Security Screw (M6x10mm long, Qty. 2)

❒ Lens Mount Security Screw (5mm Hex, Qty. 1)

❒ Warranty Card

❒ Web Registration Form

1.1.2 Key Features

- Up to 10,500 lumens
- Up to WUXGA Native resolutions
- Dual Mercury Lamp illumination with either 200W or dual 350 lamps
- Iris contrast aperture providing up to 10,000:1 contrast ratio
- Ultra-compact design and weighs less than 55lbs
- 10-bit image processor electronics with modular design
- Fully sealed optical system
- Active fan control for minimum noise level
- User interchangeable projection lenses with no-tool mounting
- PIP and seamless switching
- LiteLOC™ for constant brightness maintenance
- Intelligent Lens System (ILS)
- Motorized lens mount for all models
- Auto-setup feature
- Integrated ChristieNET
- Networking ability through RS-232 and RS-422 connectors
- Status LED display on built-in keypad for easy projector status monitoring
- Control with remote keypad, wired remote, or built-in keypad
- Four input slots for Optional Input Modules

Refer to Section 6 Specifications for a complete list of technical specifications.

Table 1.3 Mirage M Series Projectors

Model Name	Part Number
MIRAGE DS+6K-M	118-054100-XX
MIRAGE DS+10K-M	118-053109-XX
MIRAGE HD6K-M	118-052108-XX
MIRAGE HD10K-M	118-051107-XX
MIRAGE WU7K-M	118-056102-XX
MIRAGE WU12K-M	118-055101-XX

1.2   Safety Warnings and Guidelines

1.2.1 General Precautions

Do **NOT** look into the lens

DANGER
Always power down the projector and disconnect all power sources before servicing or cleaning.
Il faut toujours éteindre le projecteur et débrancher l'appareil de la prise avant l'entretien ou le nettoyage.
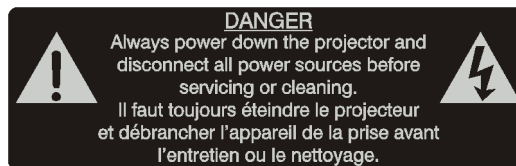
⚠ DANGER FIRE HAZARD. Keep hands, clothes and all combustible material away from the concentrated light beam of the projector. Position all cables where they cannot contact hot surfaces or be pulled or tripped over.

⚠ WARNING All installation and maintenance procedures must be performed by a Christie accredited service technician.

⚠ WARNING Projector must be operated in an environment that meets operating specifications, as listed in *Section 6 Specifications*.

1.2.2 AC /Power Precautions

⚠ WARNING Use only the AC power cord supplied. Do not attempt operation if the AC supply and cord are not within the specified voltage and power range. Refer to the license label on the back of the projector or *Section 6 Specifications* for rated voltage and power.

⚠ WARNING The projector is equipped with a 3-wire plug with a grounding pin. This is a safety feature. If you are unable to insert the plug into the outlet, contact an electrician to have the outlet replaced. NEVER defeat the safety purpose of the grounding-type plug.

⚠ WARNING Do not allow anything to rest on the power cord. Locate the power cord where persons walking on it or objects rolling over it cannot damage the cord.

1.2.3 Lamp Precautions

DANGER: LAMPS MAY EXPLODE-POSSIBLE BODILY HARM OR DEATH
The lamps are under pressure and may explode causing physical injury and/or property damage. Allow the lamps to cool before handling or unplugging the projector. Lamp replacement to be done by qualified service personnel; consult *User Manual* or lamp kit for instructions.
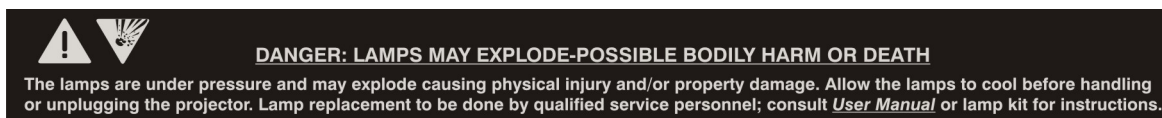
⚠ WARNING Never attempt to access the lamp while the lamp is ON. After turning the lamp OFF, it is crucial that you wait at least 10 minutes before handling the lamp. This provides sufficient time for the lamp cooling fans to properly cool the lamp. For all other precautions critical for safe removal and replacement of the lamp.

2 Installation and Setup

2.1 Projector Quick Setup and Installation

The following instructions are for those preferring a quick setup. Refer to the remaining subsections for detailed setup instructions.

> **⚠ DANGER** Always power down the projector and disconnect all power sources before servicing or cleaning.

> **⚠ WARNING** Refer to Safety Warnings and Guidelines in *Section 4 Maintenance*.

STEP 1 - Installing a Projection Lens

The projection lens, shipped separately from the projector, must be installed prior to setting up the projector.

> **⚠ WARNING** Remove the lens plug from the lens opening in the projector before installing the lens. Retain the lens plug for projector transportation to protect the projector's optical components from dust and debris.

IMPORTANT! *The lens seals the projector, preventing contaminants from entering the interior of the projector. Never operate a projector without a lens.*

LENS INSTALLATION

IMPORTANT! *Remove the rear lens cap from the lens. Keep the front lens cap on the lens to protect it during installation.*

1. Rotate the lens clamp to the OPEN position, see *Figure 2-1*.
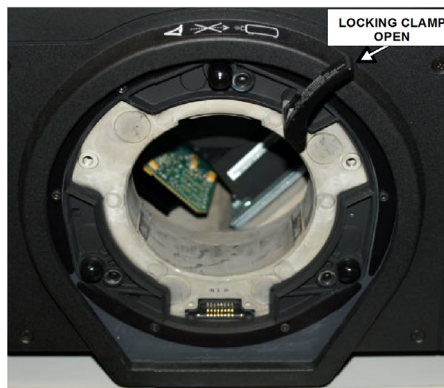
FIGURE 2-1 LOCKING CLAMP OPEN

2. Align the lens interface plate with the lens mount. Align the lens electrical connector with the mating connector on the lens mount. Fully insert the assembly straight into the lens mount opening without turning. Press using your hand as shown in *Figure 2-2*. **NOTE:** *When installing the lens, ensure that the lens is not inserted at an angle, as this can cause damage.*
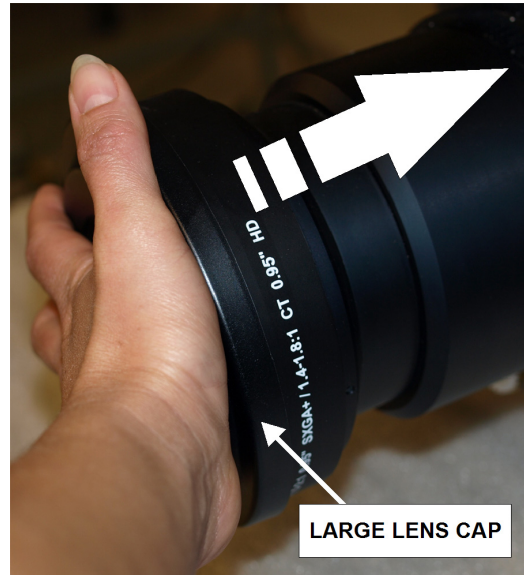
FIGURE 2-2 LENS PLACEMENT

3. Remove the front lens cap.

4. While holding the lens flat against the lens mount, rotate the lens clamp clockwise to lock the lens assembly in place. See *Figure 2-3* & *Figure 2-4*.
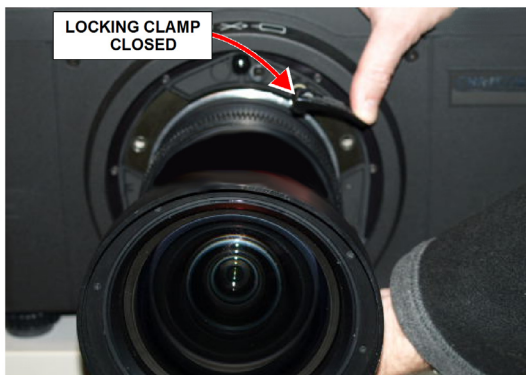
FIGURE 2-3
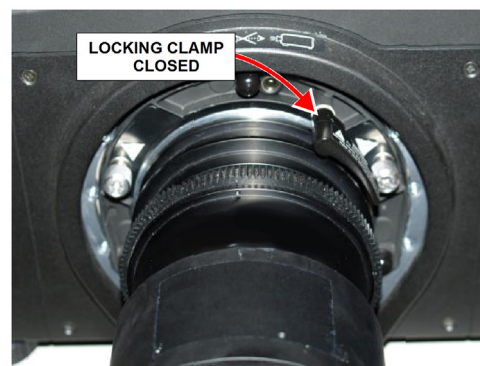
FIGURE 2-4

5. For added stability such as motion applications, fasten the security screws provided with the lens-mount. **NOTE:** There are two types of lens plate models. See *Figure 2-5* & *Figure 2-6*.

FIGURE 2-5
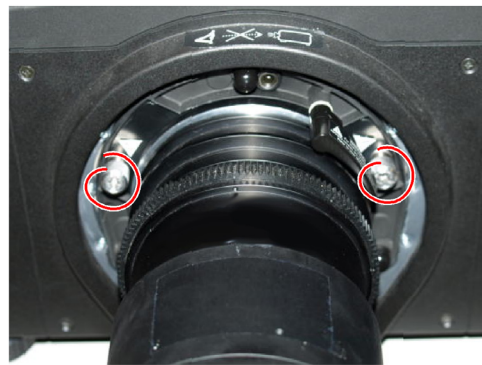
FIGURE 2-6

6. Use a 5mm hex driver to fasten the red security screws provided with the lens mount (*Figure 2-5*), or hand tighten the lens retaining screws attached to the lens (*Figure 2-6*). **NOTES: 1)** *Recommended for heaviest lenses such as 0.73:1 and 1.2:1.* **2)** *The red security screws MUST be installed when hoisting the projector overhead, or installing the projector in an overhead position.*

⚠ WARNING Use of the lens red security screws or the lens retaining screws is required if the projector is hoisted or installed in an overhead position.

STEP 2 - Positioning the Projector

⚠ WARNING 2 people are required to safely lift and install the projector.

Place the projector on a sturdy, level surface and position it so that it is perpendicular to the screen at a suitable distance. The further back the projector is positioned for the screen, the larger the image will be.

To level the projector adjust its 3 feet. With the projector positioned perpendicular to the screen the image will appear rectangular instead of keystoned.

For more detailed instructions on positioning the projector refer to *2.1.1 Mounting* later in this section.

STEP 3 - Connecting a Source

Located at the back of the projector is the input panel where all source connections are made. Each input is clearly labeled for easy identification. Depending on the type of option card installed, connect your source using the appropriate cable(s), as follows:

• **Analog Input Card**, connect 3-, 4-, or 5-wire RGB source to Red/Pr, Green/Y, Blue/Pb, H/C and V using 3, 4 or 5 BNC connectors as required.
• **Dual SD/HD - SDI Input Card**, connect SDI (Serial Digital Interface) cable to one of the two inputs, 1-IN or 2-IN. Both standard-definition (SD) and high-definition (HD) signals are accepted and automatically recognized on either input.
• **Dual Link DVI Input Card**, connect a single or dual DVI video signal to the DVI-I connector, an analog video signal to the DVI-I connector or an analog video signal to the VGA connector. The DVI signal may contain HDCP (High-Bandwidth Digital Content Protection). **NOTE:** *The VGA connector does not support active stereo input, but it can be used for dual input 3D mode.*

- **Twin HDMI Input Card**, connect HDMI (High-Definition Multimedia Interface) cable to one of the two inputs, 1-IN or 2-IN.
- **Video Decoder Input Card**, depending on the source you can apply the following;
  - Composite video source to 1-CVBS, using a BNC Cable **NOTE:** *Same signal can be used on 4, 5 or 6 when input is selected as CVBS.*
  - A component signal on Inputs 4(Pr), 5(Y), 6(Pb) using BNC Connectors. **NOTE:** *Grouped as a component input, YPbPr.*
  - S-Video to one of the two, 2-SVID or 3-SVID using S-Video cable.
  - S-Video using two BNC cables, with Luma (Y) connected to 4 (Sy) and Chroma (C) connected to 6 (Sc). **NOTE:** *Must be grouped as 1 S-Video + 1 CVBS.*
- **DMX512 Interface Card**, has two 5pin XLR connectors - 1 (input) male and 1 (output) female. If there is active communications on the DMX512 Interface card the power LED will blink between low intensity and high intensity.

STEP 4 - Connecting the Line Cord

IMPORTANT! *Use the line cord provided with the projector, or ensure you are using a line cord, power plug and socket that meet the appropriate rating standards.* **NOTE:** *Voltage and current requirements are listed on the license label, located at the back of the projector.*

Connect the projector's line cord to the AC receptacle at the AC inlet of the projector, then push the wire clip over the plug to retain it. This prevents the line cord from inadvertent disconnection. Plug the 3-pronged plug end into a suitably rated grounded AC receptacle. Switch the projector ON. The switch is located just above the AC receptacle.

⚠ **WARNING** Do not attempt operation if the AC supply and cord is not within the specified ratings. On power down, wait 5-10 minutes for the fans to turn OFF before unplugging the projector. Always switch off the projector before unplugging the AC line cord.

STEP 5 - Power up

After the AC Power has been switched on, the LCD display above the keypad indicates "Please wait" and the 4 LED status indicators on the top cover window switch on to amber. These indicate that the projector is changing its state from powered down to standby. The message "Standby Mode" appears in the display when the projector has completed its initialization and is ready for power up. The 2 lamp status LEDs will go off to indicate that the lamps are off. The Power status LED will show amber, indicating that the projector is in standby mode. The shutter LED will display amber, indicating the shutter is closed. Press and hold the power button on the keypad or remote for 2 seconds, or press twice quickly. The lamps will power on and the fans will come on. **NOTE:** *See Section 3 Operation for a full description of the status indicators.*

NOTE: *The default settings for the projector are to perform a lens calibration after the insertion of a new lens. If this is the first time the projector has been powered up with the lens, expect a short period (about 15 seconds) where the lens will move slightly.*

STEP 6 - Selecting a Source

Press one of the input keys on the remote or built-in keypad to select and display the image for the source you connected in Step 3.

2.1.1 Mounting

There are several methods for mounting the projector. In typical front and rear screen installations the projector can be mounted to a secure and level surface, such as a table or cart. Carts are useful when the projector has to be moved often. Lock the wheels on a cart, when it is in position, to prevent accidental movement during a presentation.

Ceiling Mount

The projector can be inverted and suspended from the ceiling using a specially designed ceiling mount fixture 118-100108-XX. This mounting is recommended for those that want the projector out of plain view or have limited amount of space for the projector. For more information, contact your dealer.

⚠ **WARNING** Only use Christie approved mounts designed for your projector. Refer to the installation instructions and safety guidelines provided with the mount.

2.1.2 Basic Optical Alignment

Only perform image alignment once the projector is fully assembled and powered up in its final location. Basic image alignment ensures the image reflected from the DMDs is parallel to and well-centered with the lens and screen. This initial optical alignment is the foundation for optimizing images on the screen and must be completed before final boresight adjustments. Before beginning ensure the projector is properly positioned relative to the screen.

Basic Optical Alignment Procedure

1. **Display a test pattern:** Appropriate for analyzing image focus and geometry, such as the "framing" test pattern showing the cross-hair centered across the image. Press the TEST key on the remote keypad or use the built-in keypad and press the soft key that displays Test on the LCD display.

2. **Course focus:** Do a quick preliminary focus and (if available) zoom adjustment with the primary lens. Do not worry about consistency across the image at this point, just center focus. It is good practice to have zoom adjustment color and focus adjustment color in the center of its range.

3. **Center the image in the lens:** Holding a piece of paper at the lens surface, adjust offsets as necessary until the image is centered within the lens perimeter. A full white field works best for this.

4. **If necessary, center the image on the screen:** If the projector is mounted off center to the screen axis, then offset the lens as much as required. Aim the projector over slightly towards the center of the screen, but use caution when doing so, as too much tilt will cause excessive keystone distortion. Lens offset will not.

5. **Re-check side-to-side leveling:** With the framing pattern on screen, double-check projector leveling so the *top edge* of the image is parallel to the top edge of the screen.

6. **Throw Distance:** Ensure the projector is positioned in the throw distance range for the particular lens.

2.1.3 Advanced Optical Alignment

Boresight Alignment Procedure

1. Display the Boresight Test Pattern by pressing the TEST key on the remote keypad or use the built-in keypad and press the soft key that displays Test on the LCD display, then UP ARROW KEY to cycle to Boresight, then Enter, see *Figure 2-7*.
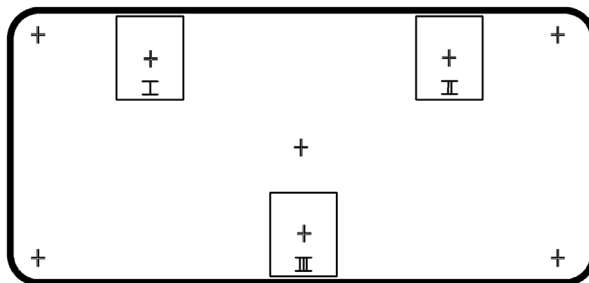
FIGURE 2-7 BORESIGHT PATTERN

2. Focus the image on cross-hair pattern I. Evaluate the focus on cross-hair image II and III. If all 3 images are in focus, no further action is required. If boresight is required see step 3.

3. If boresight is required, refer to *Figure 2-8* to understand how the adjustment screws on the lens mount affect the corresponding cross-hairs on the test pattern. **NOTE:** *The capscrew, (Figure 2-9) may be under a plastic cap, remove and retain before adjusting.*

4. Use a 5mm Allen™ key to loosen the 3 locking setscrews on the lens mount, see *Figure 2-9*, below. **NOTE:** *The setscrews must be backed out several turns, so that they do not contact the inner lens mount plate.*

| FIGURE 2-8 CROSS-HAIR PATTERN | FIGURE 2-9 SCREW LOCATIONS |
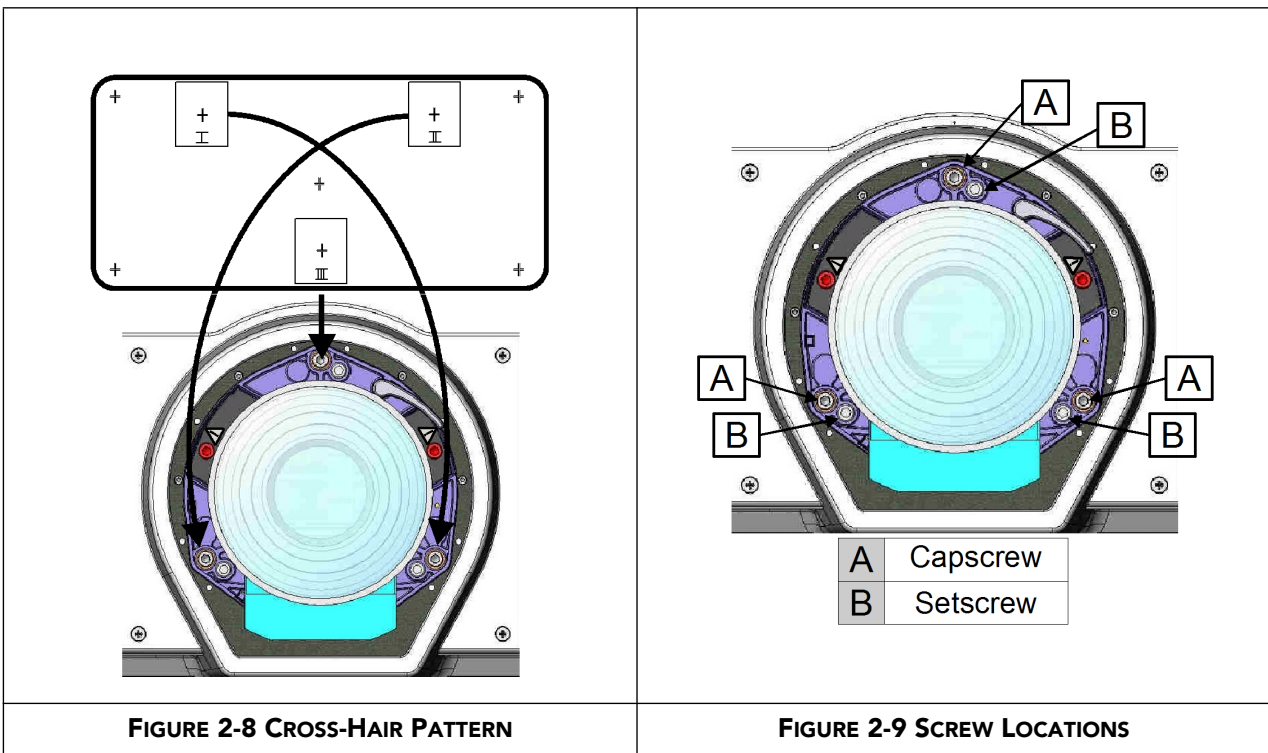
5. Fine tune the focus of cross-hair pattern I by adjusting the appropriate capscrew, see *Figure 2-9*. Adjust until the cross-hair image is in focus with minimal flare.

6. Adjust cross-hair pattern II, by adjusting the appropriate capscrew, see *Figure 2-9*. Adjust until the cross-hair image is in focus with minimal flare.

7. Adjust cross-hair pattern III, by adjusting the appropriate capscrew, see *Figure 2-9*. Adjust until the cross-hair image is in focus with minimal flare.

8. Repeat step 5, 6, and 7 as required until all 3 cross-hair patterns are in equal sharp focus. If the boresight is acceptable, see step 11. If the boresight does not appear to be converging to an acceptable level of image quality or if the lens will not focus over the correct range of throw distances, then the boresight requires coarse adjustment, see step 9.

9. The original factory boresight can be recovered approximately by positioning the 3 setscrews, see *Figure 2-9*. Position the setscrews flush with the front face of the lens mount plate and in contact with the inner lens mount plate, see below *Figure 2-10*. This may require adjusting both setscrews and capscrews.

10. If further action is required. Repeat #2.

11. Lock the setscrews, and re-check the boresight quality. Tighten the setscrew enough to ensure they will not shift.
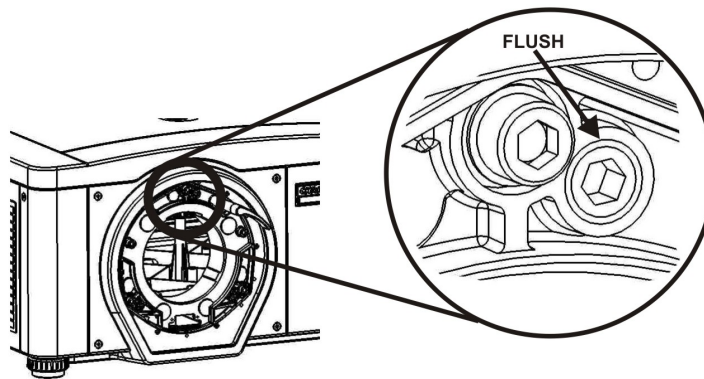
FIGURE 2-10 POSITION SETSCREW FLUSH

2.1.4 Powering Down

The projector can be powered down by using one of the following methods:

Remote Keypad/Built-In Keypad

• Press and hold POWER

OR

• Press POWER twice

OR

• Press POWER once, then immediately press the DOWN key. **NOTE:** *For Step 2 and 3, if the second key is not pressed immediately, a confirmation window will appear. The second key press must be pressed within 1 second of the window appearing.*

FIGURE 2-11 POWERING DOWN/WEB USER INTERFACE

NOTE: *After powering down, the Status LEDs cycle and the LCD displays the message "Cooling Down", until cool down is complete.*

Web User Interface (UI)

1. From the **Main** Tab, Select **Power>OFF**. **NOTE:** *A window will display for confirmation on powering down, see Figure 2-11.*

2. Select **Yes**.

2.1.5 Projector Communications

Status LEDs

Looking from the back of the projector, the LEDs represent, from left to right; Lamp 1, Lamp 2, Power, and Status. The LEDs will display the colors as shown below:

Projector State	LEDs	LED State
Hard Boot	All	All LEDs amber - means please wait
Standby Mode	Lamp 1 & 2	**Off** - lamps are off
	Power	**Amber** - AC is present but projector is off or standby
	Shutter	**Green** - shutter is open
		Amber - shutter is closed
Warm-up (Powering ON from standby)	All	LEDs cycle green from left to right
Normal Operation	Lamp 1 & 2	**Amber** - lamp time has expired and lamp should be replaced
	Power	**Green** - projector is powered up and operating normally
	Shutter	**Green** - shutter is open
		Amber - shutter is closed
Cool-down	All	LEDs cycle amber from left to right
Error	Lamp 1 & 2	**Amber** - lamp time has expired and lamp should be replaced
		Flashing Red - lamp has malfunctioned
	Power	**Flashing Red** - error has occurred. Details are displayed on the status display
Projector State	LEDs	LED State
Software Upgrade in progress	All	The pattern will alternate between: Amber, Off, Amber, Off and Off, Amber, Off, Amber
Lamp Regeneration in progress	Lamp 1 & 2	**Flashing Green** - the lamp is being switched off for its regeneration period to extend lamp life (typically 15 minutes every 24 hours)
	Power	**Green** - on or **Amber** - standby
	Shutter	**Green** - shutter is open

NOTE: A condition occurs on the first power on after a software upgrade, and is indicated by all the following:

- The Status LEDs are cycling green
- The LCD displays the warning "Image Processor Upgrading"
- The LED on the Image Processor card flashes green
- The Web page shows a warning that the Image processor card is upgrading.

When this occurs, the projector should not be AC power cycled and the Image Processor card should not be removed.

3 Operation

This section describes the controls and switches used for basic projector operation once it is properly installed, aligned and configured by a Christie accredited service technician.

⚠ WARNING   Refer to Safety Warnings and Guidelines in *Section 4 Maintenance*.

3.1 Using the Remote Keypad or Built-In Keypad

The projector is typically controlled using one of the following keypads:

• **Remote Keypad** for wired or wireless control up to 25 feet (8m) away (includes cable for use as a wired remote). The remote keypad controls the projector by way of wireless communications from a battery-powered infrared (IR) transmitter. Use the remote keypad the same way you would use a remote keypad supplied with a TV or VCR. When pressing a function key, direct the keypad toward the projector's front or rear IR sensor. One of the two IR sensors on the projector will detect the signal and relay the commands for internal processing. A laser pointer is built into the remote keypad. See *Figure 3-1*.

• **Built-in Keypad** located at the side of the projector, see *Figure 3-2*.

While each of the keypads provides complete control of the projector, they differ slightly in their arrangement of keys and in what functions can be accessed directly with a key press rather than requiring use of the menu system. You may find one keypad more convenient than another for your specific installation and application.

Guide to Keypads

Keep these guidelines (common to both keypads) in mind:

• Press keys one-at-a-time; there are no simultaneous key combinations required. **NOTE:** Use POWER, SHUTTER*, and* OSD *functions by doing one of the following: "press-and-hold" (2 seconds) or press twice quickly, followed by pressing either the* UP ARROW KEY *to switch on or the* DOWN ARROW KEY *to switch off once. See Figure 3-1*.

• Arrow keys are held down for continuous adjustment/movement in the related key direction. **NOTE**: *In serial networks, pause briefly between adjustments to make sure that more distant projectors can "keep up" with the commands. If you press a key while the projector is still responding to the previous action, such as during power-up, the second key press may not take effect.*

Refer to *Figure 3-1* for the description of those keys provided for the remote keypad.

⚠ WARNING   Laser radiation is emitted from the laser diode in the remote. DO NOT look directly into the beam of the laser.

Remote Keypad

Laser Pointer Status LED
•*Activated when Laser pressed*

Test
• *Display a test pattern*

Shutter*
• *Open or close the shutter*

Power*
• *Turn projector ON or OFF*

Plug In for Remote Keypad
•*Left side of remote keypad*

Auto
• *Optimize image automatically*

Slots
• *Display the source from the next active input on the card in the selected slot*
NOTE: If PIP is on, Input keys affect the PIP window only.

Lens Functions
• *Use◄ and ►keys to adjust parameters*

Input
• *Select an active or inactive input on any slot*

OSD*
• *Use to hide or show menus - Press OSD▼ to turn Off*

PIP
•*Turn picture-in-picture ON or OFF*

Swap
• *Swaps the Main and PIP image*

Menu
• *Display menus*

Exit
• *Return to previous menu level or exits menus if at top level*

Arrow Keys
• *Adjust a setting up or down*
• *Navigate within a menu*

Enter
• *Select a highlighted menu item; change or accept a value*

Channel
• *Select channel (setup)*

Projector
• *Select a projector in multi-projector installations*

Laser
• *Activate laser pointer at front of keypad*

Bright
• *Adjust amount of light in image*

Gamma
• *Adjust mid-range levels*

Contrast
• *Adjust difference between light / dark*

Number Keys
• *Enter a number, such as channel, value, etc.*

NOTE: Can be set to select inputs if desired.

Func
• *Enter special code such as color enabling or enter ━ for a negative numeric value*

Help
• *Display context-sensitive help (toggle)*

10+
• *Enter 0 digit in a numeric field or add 10 to subsequent number for a menu selection of 10 or more*

* TOGGLE KEYS =

Press *and hold* to toggle or press twice to toggle or press *and release,* followed by ▲ON or ▼OFF

FIGURE 3-1 REMOTE KEYPAD

Wired Remote

You can convert the remote keypad into a wired remote keypad using the cable provided with the projector. Connect one end into the remote and the other to the XLR connector on the input panel labeled as wired keypad. The wired remote is recommended when:

• The built-in keypad is inaccessible
• The lighting conditions are unsuitable for proper IR transmission

NOTE: *Leave the batteries in the wired remote for the laser pointer key to work.*

Built-in Keypad
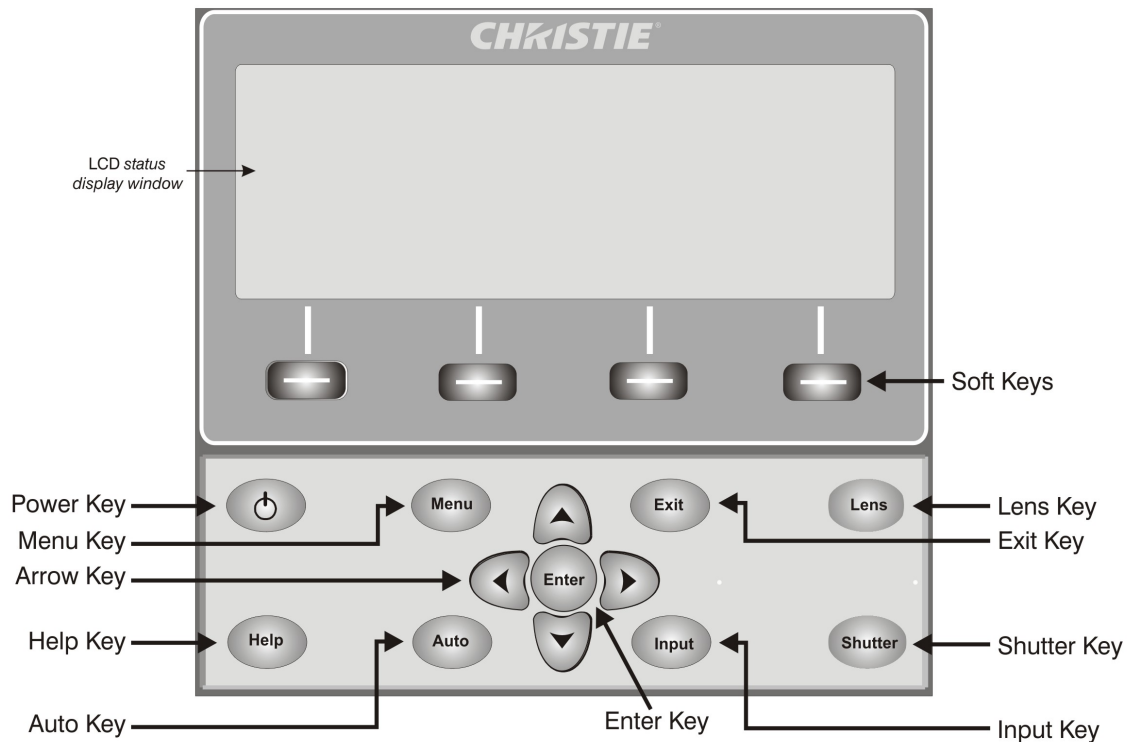
FIGURE 3-2 BUILT-IN KEYPAD

The built-in keypad has a LCD status display window which displays all states of the keypad controls. The LCD displays status information when the projector is powering up "Warm up: Lamp is warming up" and when the projector is cooling down "Cool down: Lamp is cooling down." The display shows the state of the keys, menu structure, and menu items.

Overview of LED and Key States

The LED color of the keys indicates that the key is in one of these states:

• **Amber**, a functionality is available that will affect the displayed image of the projector
• **Blue**, a functionality is available that is relevant to the built-in LCD only and will not affect the displayed image from the projector
• **Off**, the key is disabled in the current context
• **Power Key**, used to switch from Standby mode to ON, and from ON to Standby mode; LED always remains Amber

- **Help Key**, only available in the On Screen Display (OSD) context; LED is Amber when the menu is being displayed on the projected image display; when no menu is being displayed, the Help key is still enabled if the OSD is enabled. It is only disabled when the entire OSD is set to OFF.
- **Auto Key**, enabled state when the power is ON, and there are no test patterns on the screen. If the power is **OFF** or a test pattern displays, the Auto key is disabled.
- **Exit Key**, is determined in the specific context of the screen being displayed.
- **Input Key**, enabled when the power is ON. Disabled if the power is OFF.
- **Lens Key**, enabled when the power is ON. Disabled if the power is OFF.
- **Shutter Key**, enabled when the power is ON. Disabled if the power is OFF.
- **Menu Key**, always remains in the enabled state when the power is ON. If the power is off the Menu key is disabled.
- **Soft Key**, used to select an action indicated by text above the key on the LCD. If no text is shown, the associated key is disabled.

3.1.1 Remote Keypad Commands

Specific keypad commands are explained, see *Figure 3-1*:

Power ON/OFF

Press and hold POWER for two seconds or press twice quickly to action the projector ON or OFF. Or press and release POWER followed immediately by UP ARROW KEY (ON) or DOWN ARROW KEY (OFF) to guarantee the correct action (useful if you are unsure of the present state). **NOTES: 1)** *After powering down, the lamp cooling fan remains on for approximately five minutes to cool the lamp.* **2)** *Avoid turning the projector back on until it has been off for a few minutes. Hot re-strikes of the lamp will reduce lamp life.*

Test

Steps forward through all internal test patterns. After stepping past the last test pattern, you will return to current input.

Press TEST and then cycle by using the UP ARROW KEY and DOWN ARROW KEY arrow keys, to cycle in either direction through the test patterns. Press EXIT to return to the current input.

Auto

Initiates an automated process in which the projector optimizes critical display parameters such as size, position, pixel tracking, etc., for the current source. These parameters are listed in *Table 3.1*. An auto setup can save time in perfecting a display and you can modify the adjustments as desired.

Table 3.1 Auto Setup

OPTIMIZES:	SETS TO DEFAULT:
Pixel Tracking	**Contrast**
Pixel Phase	**Brightness**
Size and Blanking	**Auto Input Level (off)**
Vertical Stretch	**Detail** *(if video source)*
Position	**Filter**
Input Levels	**Luma Delay**

NOTE: *You must have an unlocked channel present to use Auto Setup.*

The best auto setup will be obtained under the following conditions:

- Input levels, it is best to have an image with saturated (very bright) colors.
- Phase, high contrast edges are needed.

To determine active window size:

- Video images should have whites and blacks in the image.
- Wide range video images should have content (including white) that extends to all edges of the image.

Channel

Select a specific source setup (channel) defined and stored in projector memory. Once you enter a two-digit channel number (or, if there is a list displayed, highlight it and press ENTER), the display will automatically change and update according to the numerous setup parameters defined for that channel. **NOTE:** *A new channel is automatically created if you adjust an image from a new source.*

> **NOTE:** CHANNEL *key behavior during a presentation depends on whether or not the Display Channel List option is enabled in the* **Menu Preferences** *menu. You can choose to use a scrollable list of channels when you press* CHANNEL, *or you may prefer to enter the desired channel number "blind", i.e., without on-screen feedback. See* **Menu Preferences** *later in this section.*

Slot 1, 2, 3, 4

Press to display the next active input on the card in the slot.

Input

Displays all inputs in all slots, both active and inactive. Scroll through the list to select an input for the main image. Press Input again to show the list and select the picture-in-picture (PIP) image.

PIP

Turns PIP ON or OFF. **NOTE:** *This function is disabled in 3D mode.***Swap**

Swaps the main and PIP images.

Contrast

Changes the level of peak white in your images. Use LEFT/RIGHT ARROW KEY until you reach the desired level of contrast—for best results, start low and increase so that whites remain bright but are not distorted or tinted and that light areas do not become fully white (i.e., "crushed"). Conversely, low contrast causes dim images.

Bright

Increases or decreases the black level in the image. Use LEFT/RIGHT ARROW KEY until you reach the desired level of brightness. For best results, start high and decrease so that dark areas do not become fully black (i.e., "crushed"). Conversely, overly high brightness changes black to dark grey, causing washed-out images.

Gamma

Determines how grey shades are displayed between minimum input (black) and maximum input (white) for a given amount of signal. The proper setting helps maintain optimized blacks and whites while ensuring a smooth transition for the "in-between" values utilized in greys. Unlike brightness and contrast controls, the overall tone of an image can be lightened or darkened without changing the two extremes and your images will be more vibrant yet with good detail in dark areas when using the Gamma control.

The nominal setting for Gamma Correction of 0 is correct for most signals and conditions. If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, increase the gamma correction setting to compensate. **NOTE**: *The range for this control has changed. After an upgrade from version 1.2 or earlier to version 1.3 or later, the setting for Gamma Correction must be set again.*

Number Keys

Press 1 to 9 to enter a value in a text box or to select a menu item.

10+

Press **0** before pressing another number to enter a number greater than 9, e.g. press **0** then 2 to enter the number 12 as a menu selection. **NOTE:** *When entering numbers in a text field, this button acts as 0.*

Help

Press HELP to display context-sensitive help. Press HELP again to toggle the help window OFF.

Menu

Press MENU to enter or exit the projector's menu system.

OSD (On-screen display)

Press OSD then the DOWN ARROW to hide the projector's menu system during use. To see the menus again, do one of the following:

- Press and hold OSD for two seconds.
- Press and release OSD followed immediately by UP ARROW.
- Press OSD, OSD**.**

Invisible menus are fully functional, enabling "hidden" access to numbered features and image adjustments by entering the corresponding sequence of key presses on the keypad.

NOTE: *With OSD "on", you can still hide error messages and slide bars by disabling these options in the* **Menu Preferences** *menu.*

Shutter

Press and hold SHUTTER for two seconds to toggle the internal mechanical shutter blade closed or open with a single keystroke. Or press and release SHUTTER followed immediately by UP ARROW KEY (closed) or DOWN ARROW KEY (open) to guarantee the correct state (useful if you are unsure of the present state). Alternatively, press SHUTTER, SHUTTER to toggle from the present on/off state.

A closed shutter blanks the display (turns it to black). Close the shutter to block the displayed image while maintaining access to projector functions. Opening the shutter restores the image. **NOTES: 1)** *The LCD display shows the current state of the shutter.* **2)** *The shutter is open upon power-up.*

Function Key

IF WITHIN A NUMERIC FIELD IN A MENU: Use FUNC to enter a negative number.

IF WITHIN A TEXT FIELD: Press FUNC followed by the UP ARROW KEY or DOWN ARROW KEY to convert between capital and lower case letters. Press FUNC followed by the LEFT ARROW KEY or RIGHT ARROW KEY to insert or delete a character. Press FUNC followed by ENTER to delete all characters.

IF WITHIN A PRESENTATION: Press FUNC followed by two numeric numbers to enable a specific color or colors in the display (see right). For example, ⊖ 6 1 will display only red, and ⊖ 6 2 will display green data. Eliminating one or more colors can help with certain diagnostics and setups, such as when accurately overlaying one image on top of another from stacked projectors. **NOTE:** *Color enabling can also be implemented from numerous locations within the menu system.*

⊖ 6 0 = White (all colors)
⊖ 6 1 = Red
⊖ 6 2 = Green
⊖ 6 3 = Blue
⊖ 6 4 = Yellow
⊖ 6 5 = Cyan
⊖ 6 6 = Magenta
⊖ 6 7 = White (all colors)

FIGURE 3-3 FUNCTION KEY

Press FUNC followed by HELP to disable **Keystone**, **Edge Blending** and **Brightness Uniformity** settings. This will disable the features without changing the settings associated with them.

Projector

Press PROJ to access a specific projector within a group of projectors or to confirm if the local projector is listening. The number in the "Enter Number" window indicates which projector is currently listening to commands, and will match the projector number that has been defined in the **Menu Preferences** menu.

The PROJ check box (read-only) shows whether or not the projector physically connected to a keypad is listening to commands from that keypad. A checkmark means that connected projector is listening; if there is no checkmark, you are communicating with a different projector.

To control a specific projector with the keypad, press PROJ and then enter the three-digit number assigned to the projector you want to use. If you switch to a projector other than the one you are currently using, the checkmark will disappear.

To broadcast to multiple projectors, press PROJ and then PROJ again without entering a projector number. Keypad commands will then effect all projectors present. **NOTE:** *There is no method of controlling a group of projectors within the same wired configuration using the wired keypad exclusively, since there is only one wired protocol available*. **NOTE:** *The projector's address can be set in the* **Configuration** *Menu>* **Communications** *Submenu.*

Enter

Press ENTER to select a highlighted item, to toggle a check box, or to accept a parameter adjustment and return to the previous menu or image.

Exit

Press EXIT to return to the previous level, such as the previous menu. **NOTE:** EXIT *does not save changes within text editing boxes (including number editing of a slide bar value) or within pull-down lists. It acts as a "cancel" in these cases.*

Arrow Keys

Use the LEFT/RIGHT ARROW KEY to change a slide bar value or to select a different option within a pull-down list without having to first scroll through options or navigate within a menu, pull-down list or text box.

Lens H and Lens V

When adjusting the image for focus, zoom or horizontal and vertical positioning, use the specific arrow keys (LEFT/RIGHT ARROW KEY or UP/DOWN ARROW KEY) related to each function. A small window will appear to indicate the type of adjustment taking place. For example,

- Use the FOCUS and the LEFT ARROW or RIGHT ARROW KEY to improve image clarity as desired.
- Use the ZOOM and the LEFT ARROW or RIGHT ARROW KEY to achieve a desired image size.
- Use the LENS H and the LEFT ARROW or RIGHT ARROW KEY to position the image horizontally.
- Use the LENS V and the UP ARROW or DOWN ARROW KEY to position the image vertically.

Press EXIT to return to a presentation level. **NOTE:** *Use the* LENS *key (built-in keypad) with the general* UP/DOWN ARROW KEY *to get the same effect as if using the arrow keys related to "Lens V" or "Lens H" on the Remote Keypad. All 4 lens settings can be adjusted by using the soft keys.*

Laser

Press LASER to activate the laser pointer on the remote. Point the remote at the screen to highlight an area of your presentation.

NOTE: *Leave batteries in the wired remote keypad for the* LASER *key to work.*

CAUTION

LASER RADIATION
DO NOT STARE INTO BEAM

LASER DIODE

Wavelength 670nm
Max Output 1mW
CLASS II LASER PRODUCT
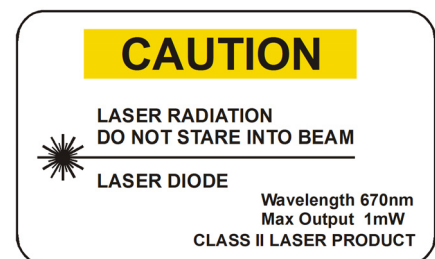
3.2 Navigating the Menus

Main Menu

Most of the projector controls are accessed from within the projector's menu system. There are several groups of related *functions*, with each group selectable from the **Main** menu as shown at right. Press MENU at any time to display this **Main** menu.

On the remote keypad, enter the number corresponding to the function menu you wish to access, such as 2 for the **Image Settings** menu. Or use the UP/DOWN ARROW KEY on any keypad to highlight the desired option, then press ENTER. The corresponding function menu or pull-down list of further options will appear.

Main Menu	
1. Size & Position	▶
2. Image Settings	▶
3. Channel Setup	▶
4. Configuration	▶
5. Lamp	▶
6. Status	
7. Secondary Input & Switching	▶
8. Language	🌐 English ▼
9. Test Pattern	Off ▼

FIGURE 3-4 MAIN MENU

With a function menu displayed, enter a menu option number for any numbered option, or use the UP/DOWN ARROW KEY to highlight the desired option and then press ENTER. Long menus have a scroll bar on the right—use the arrow keys to access the remainder of the menu. Locked items or items that do not pertain to the current action or condition appear dimmed and cannot be selected.
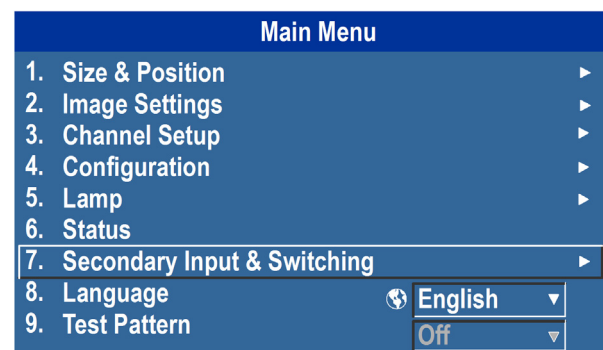
When finished with a function menu:

- Press EXIT to return to the previous screen.

OR

- Press MENU to leave the menu system and return to the presentation.

  NOTES: 1) *If there is no signal present, all source-dependent adjustments are disabled.* **2)** *After 15 minutes of inactivity, the projector leaves the menu system and returns to the presentation.* **3)** *The Status menu is read-only.*

On-line Help

Press HELP to display summary information about the current menu or highlighted option. Press HELP again to exit.
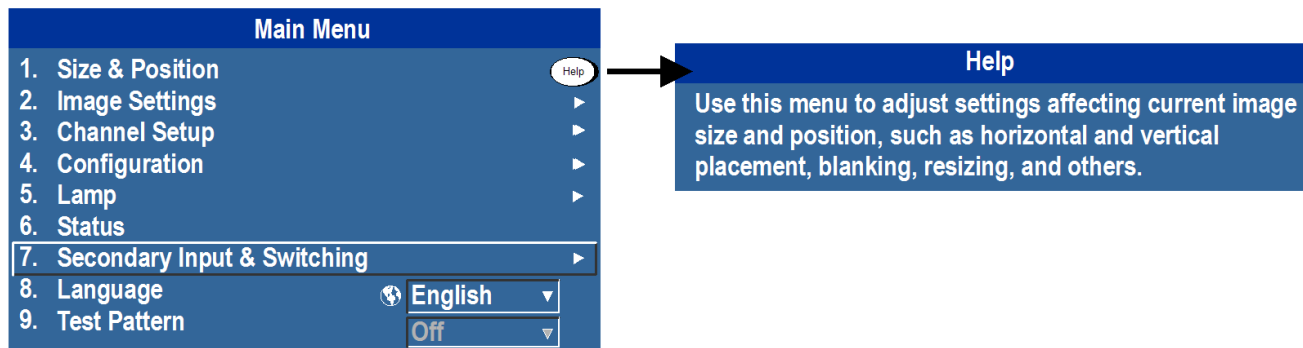
FIGURE 3-5 ON-LINE HELP

The Global Icon

Menu options that include this icon apply universally. Menu options without this icon apply to the selected channel only.

Using Slide bars and Other Controls

Most of the function menus allow you to change settings by using slide bars, check boxes, and pull-down lists. Navigating options:

- Enter the menu option number corresponding to the setting you wish to change (for example, press MENU 1 3 to select "Vertical Stretch" in the **Size and Position** menu).
- Move the highlight to the option desired and press ENTER.
- Move the highlight to the option desired and press LEFT/RIGHT ARROW KEY to adjust immediately.
- You can bypass the menus entirely and use a single key to immediately access an adjustment during your presentation (applies only to options having their own key, such as Contrast, Brightness, Gamma, etc.).
- For "blind" access, hide the entire menu system (see OSD key, above) and access using the proper sequence of key presses.

Slide bars in menus – The current value for a given parameter, such as size or vertical stretch, appears to the left of its slide bar icon (adjustment window). This number often expresses a percentage, or it may have units associated with it (such as pixels), depending on the specific option. Press LEFT/RIGHT ARROW KEY to gradually adjust the setting up or down—both the number and the length of the bar change accordingly. Hold for continuous adjustment. Or press ENTER to activate a slide bar text box for specific number entry via the keypad and then press ENTER to save (or press EXIT to cancel).

White Uniformity
1. Left Side   🌐 35.6 ▮

FIGURE 3-6 EXAMPLE OF A SLIDE BAR

"Direct" slide bars - For quick access, to Gamma, Brightness, and Contrast slide bars without traveling the menu system. Press Gamma, Brightness, or Contrast to display the contrast slide bar.

Use the arrow keys to adjust a direct slide bar, or press ENTER and enter a specific number from the keypad, then ENTER or LEFT ARROW KEY or RIGHT ARROW KEY to save (or EXIT to cancel). When you are done, press EXIT to save and return to your presentation.

NOTES: 1) *You can still adjust a direct slide bar as usual if the display is turned off (see* OSD *or* **Menu Preferences** *menu) — the slide bar just won't be visible.* **2)** *A direct slide bar disappears if it is not used within five seconds.*

Check boxes - Conditions are present if its adjacent check box contains a checkmark. To toggle the check box, highlight and press ENTER, or highlight and use RIGHT ARROW KEY to check and LEFT ARROW KEY to uncheck. If a check box is numbered, enter its number to immediately toggle the check box.

Edge Blending
1. Blending Enable 🌐 ☑

FIGURE 3-7 EXAMPLE OF A CHECK BOX

Pull-down lists – To see a pull-down list of options available for a given parameter:

• Highlight the list and press ENTER; or

• Enter the menu option number

Use the UP ARROW KEY or DOWN ARROW KEY to navigate up and down within the list. Press ENTER to choose an option from the list.

Communications	
1. Serial (RS-232 IN) Options	▶
2. Serial (RS-232 OUT) Options	▶
3. Serial (RS-422) Options	▶
4. Projector Address	🌐
5. Network Routing	🌐 Separate ▼
6. Ethernet Settings	🌐 ▶
7. Broadcast Key	🌐 ☑
8. Front IR Enable	🌐 ☑
9. Back IR Enable	🌐 ☑
10. Wired Keypad Enable	🌐 ☑

1.	Separate
2.	RS-232 and RS-422 Joined
3.	RS-232 and Ethernet Joined
4.	All Joined
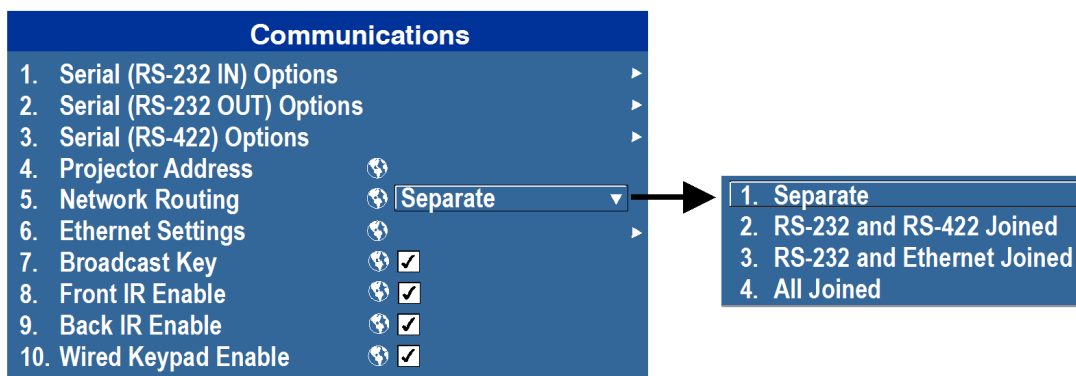
FIGURE 3-8 EXAMPLE OF PULL-DOWN LIST

If you prefer to quickly scroll through a list without first pulling it down, highlight the option and use LEFT ARROW KEY or RIGHT ARROW KEY. Press ENTER when the desired choice appears. **NOTES: 1)** *Press* LEFT ARROW KEY *or* RIGHT ARROW KEY *to jump between pages in an extra long pull-down list.* **2)** *Press* EXIT *while in a pull-down list to cancel any change.*

Editing Text

Activate the Edit Window: To enter or edit text, highlight the desired parameter (such as a channel name) and press ENTER to activate its adjacent edit window. Any previously entered text is displayed with its first character highlighted in a square cursor, signifying that this character is ready for editing.

Navigate Within the Edit Window: Press RIGHT ARROW KEY to move the cursor forward or LEFT ARROW KEY to move the cursor backwards as desired.
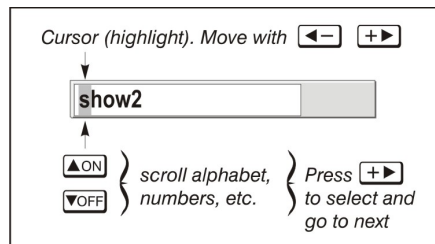
FIGURE 3-9 ENTERING TEXT

Edit a character: To edit a highlighted character, use UP ARROW KEY and DOWN ARROW KEY to scroll through the alphabet, numbers, spaces and punctuation available. When the character you need appears, press RIGHT ARROW KEY to select it—the cursor will move to the next available character of current text. To convert a lower case letter into a capital letter, position the cursor on the letter and press FUNC followed by the UP ARROW KEY. To convert a capital letter into a lower case letter, position the cursor on the letter and press FUNC followed by the DOWN ARROW KEY. **NOTE:** *Also enter numbers directly from the keypad.*

To convert a lower case capital letter, position on the letter and press FUNC followed by the UP ARROW KEY, To convert a capital letter into a lower case letter, position on the letter and press FUNC followed by the DOWN ARROW KEY.

Add or Delete a Character or Space: To insert a space at the cursor location, press FUNC then the RIGHT ARROW KEY. To delete a highlighted character (or space), press FUNC then the LEFT ARROW KEY.

Delete all Characters: Press FUNC followed by ENTER.
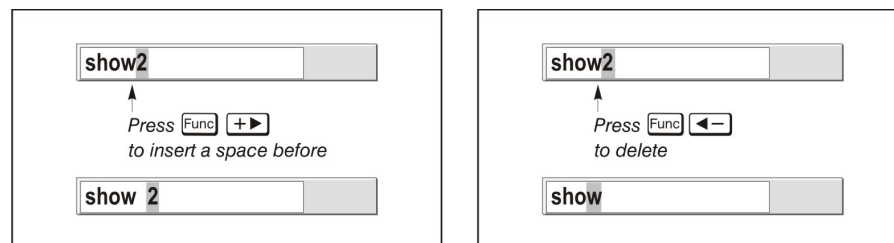
FIGURE 3-10 ADD/DELETE CHARACTER OR SPACE

Press Enter When Finished: To accept edits and leave the edit window, press ENTER.

NOTE: *Press EXIT at any time to cancel changes and return to the previously defined text.*

Edit numerical values:

Enter numbers directly from the keypad to specify numbers representing projectors channels (source setups), or slots. *As each digit is entered, it is inserted on the right of the field, and the numbers already in the field are shifted on the left.* The channel numbers are defined with two digits—for example, if you enter only a single digit (such as "7") for a channel number, the channel will automatically be defined as "07".

Enter "07" to utilize this channel. *If you press any non-numbered key, the number entered up to that point is accepted and updated as the new value. Press* EXIT *to cancel editing of numerical values.*

3.3 Alarm Conditions

An alarm condition consists of a message that is on the LCD display located beside the built-in keypad, see *Figure 3-11*.

There are two types of alarm conditions:

• Warning Alarm
• Critical Alarm

TYPE OF ERROR   INDEX OF ALARM

ALARM ITEM
ALARM STATUS

Warning Alarm   2/3 — TOTAL # OF ALARMS
Card Cage Fan
1488 RPM

Prev   Next   OK

SOFT KEY

FIGURE 3-11 EXAMPLE OF ALARM CONDITION

A warning alarm is shown when an error or a non-optimal condition has occurred. That will generally not prevent the projector from operating. An example is when a temperature is slightly elevated.

A critical alarm is shown when a condition occurs that could prevent the projector from operating and could cause damage to the projector. This may cause the projector to shut down automatically. An example would be a fan not running.

Both alarm types display:

• the item of alarm
• the status of the item

The item of the alarm can be either physical, i.e. fan or sensor, or the alarm can be a software issue, i.e. lamp driver. The LCD displays the status of the item and its units; if applicable. If the status of the item is out of normal range an alarm is created. When the status of the item is within normal range the alarm will clear.

> **NOTES: 1)** *When an alarm is displayed in the LCD display, the built-in keypad is disabled. To confirm the alarm, press the OK soft key to enable the built-in keypad.* **2)** *The alarm condition can also be viewed using the remote in the read only Status menu.*

3.4   3D

The Mirage M Series projector is capable of displaying stereoscopic 3D video sources. The Mirage M Series relies on additional hardware; such as stereo emitters and glasses to complete the display system.

Images generated from a stereo 3D-video source consist of a series of images (*frames*) that alternate quickly between two slightly different view points, corresponding to our left and right eyes. When these frames are displayed fast enough and viewed with special stereo glasses synchronized to the left/right (L/R) changes, the resulting image appears with the same depth and perspective that is sensed in the real world.

NOTE: *The type of special glasses can be active stereo or passive stereo glasses depending on the type of stereo controllers and screen used.*

3.4.1   Requirements

Stereo 3D applications require a stereo 3D-capable source, special hardware/software setups described below, and the projector's *3D Settings* menu option to control the projector's processing, synchronizing and displaying of your stereoscopic 3D source material.

Hardware:

- Christie's 3D version of Mirage *M Series* projector.
- Christie's 3D Stereo Sync Cable (required for 3D Mirage M Series models; ensures minimum frame delay). This General Purpose Input Output (GPIO) cable is standard with all Mirage M Series projectors. **NOTE:** *GPIO, Refer to Appendix C.*
- A source, usually a computer with a stereo 3D graphics card capable of displaying progressive scan (alternating frames) of Open GL quad buffered stereo 3D applications (suggested cards include ATI or NVIDIA), and running under *Windows (2000, XP), Windows 7, Linux, IRIX, HPUX, OSX* or *Solaris* operating systems.
- Emitter for controlling active shutter glasses.

An appropriate qualified device that mounts in front of the lens of the projector that will process the light from the lens into a passive polarized light. Contact your Immersive dealer for more information.

Software or content:

- Any 3D computer software that supports active or sequential 3D stereo on a supported computer/graphic card.
- A video stream from video source that has been prepared to be sequential content. The Mirage M Series also supports stereo signals prepared on either a compatible Dual and Single link HDSDI format. **NOTE:** *VGA port does not support 3D.*
- Frame locked Passive sources are also compatible with the Mirage M Series with the appropriate primary and secondary input card.

CONNECTING THE 3D STEREO SYNC CABLE

This GPIO cable provides the means for synchronizing the various components in your 3D system. Your source, projector display output, and emitters or 3D passive filter system can then operate together with precision to minimize cross-talk and color artifacts. Connect as shown below in *Figure 12.* **NOTE:** *For Mirage M Series models, inputs A and B are not required, but recommended to ensure that stereo is configured correctly, especially for multiple projector setups.*
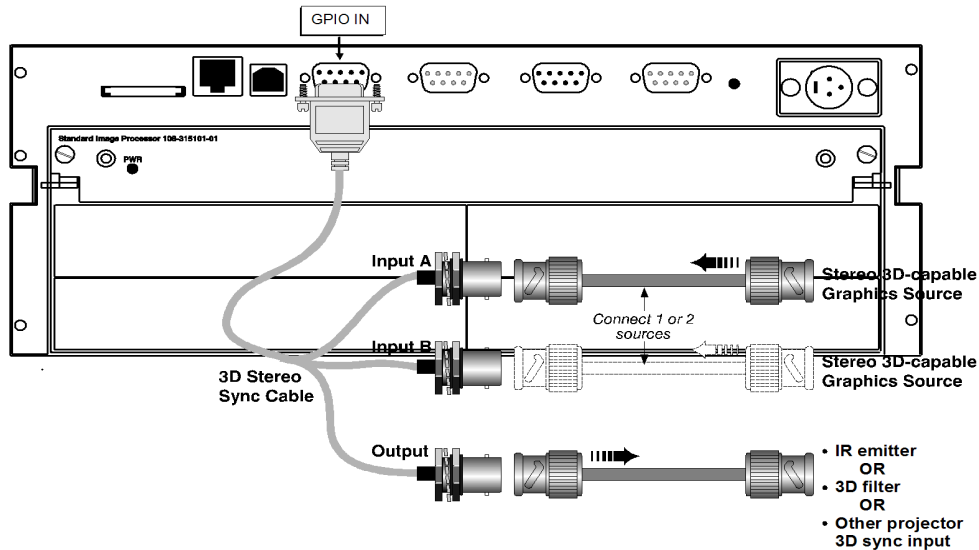
Figure 12 - Mirage M Series 3D Stereo Sync Cable

Connecting Two Stereo 3D Sync Inputs (Recommended for multiple sources). Connect your video card's stereo 3D sync cable to either Input A or either Input B on the 3D Stereo Sync Cable. These inputs are provided to allow you to connect two different Stereo 3D sources and conveniently switch the display back-and-forth between them.

Connecting One Stereo 3D Sync Output, connect the 3D Stereo Sync Cable output to your stereo 3D sync emitter or 3D passive filter system.

3.4.2   Active and Passive Stereo 3D Configurations

Typical hardware configurations for active and passive Stereo 3D systems are shown in *Figure 13* and *Figure 14*.
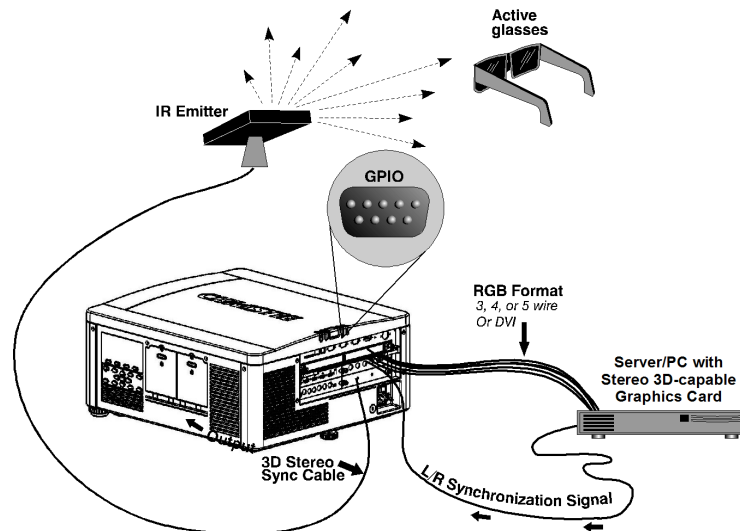
Figure 13 - Mirage M Series - Typical Stereo 3D Configuration: With Active Glasses
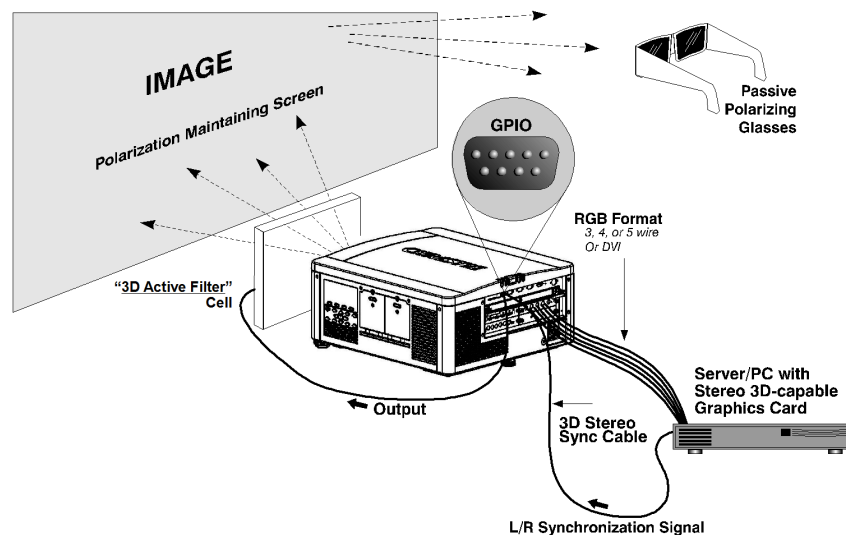
Figure 14 - Mirage M Series - Typical Stereo 3D Configuration: With Passive Glasses

Appropriate Stereo 3D Source: Use stereo 3D application software with your 3D video source (usually a workstation or PC). The source must also provide a separate stereo 3D synchronization signal that precisely controls when left/right fields are visible through the viewer's glasses. This separate signal is usually provided using a VESA 3 pin stereo port.

IR Emitter/3D Passive Filter System: In response to an incoming sync signal, the emitter emits L/R infrared signals to a receiver in active 3D shutter glasses, causing the L/R shutters to alternately open and close for active stereo 3D applications. Likewise, a 3D passive filter system placed in front of the lens responds to an incoming sync signal and alternately polarizes the L/R frames viewed with passive glasses for active stereo 3D applications. Connecting one of the 3D Stereo Sync Cable outputs to an emitter/3D passive filter system allows you to synchronize your stereo 3D display with the glasses.

Glasses (Active/Passive): Active glasses differ in speed and performance. Consult the documentation for your glasses and keep their specifications in mind when configuring your source signal. The input signal must be optimized for the available shutter speed to prevent obvious "ghosting" of image content (known as cross-talk in stereo 3D applications) and other more subtle color artifacts. Such problems indicate that the eyes are detecting portions of the opposing frame due to an "out-of-sync" system, and can occur in either active or passive stereo 3D configurations. Adjust the Dark Interval setting to reduce ghosting.

In the 3D Settings menu, the correct "3D Stereo Sync Delay" setting should help to synchronize glasses with the displayed images. **NOTE:** *In a passive system, where glasses do not have shutters and instead depend on the speed and accuracy of the 3D passive filter system, the signal must be synchronized to the projector via the 3D Stereo Sync Cable.*

4.2 3D SETTINGS

Use the options in the 3D Settings menu to make the timing adjustments necessary for realistic simulation and 3D images. See *Figure 3-15*.

3D Settings

	3D State	Valid
1.	3D Mode	Native 3D ▾
2.	Dark Interval	2.50
3.	3D Sync Input	Input A ▾
4.	Invert 3D Input	☐
5.	3D Sync Output	To Emitter ▾
6.	3D Stereo Sync Delay	5.92
7.	3D Test Pattern	☐
8.	Frame Locking	🌐 Frame Lock ▾
9.	Set Frame Delay	🌐 0.148
10.	Actual Frame Delay	0.148
11.	Full Screen Eye-Motion Filter	🌐 ☑
12.	Eye-Motion Filter	🌐 70
13.	Edit Secondary Channel Settings	🌐 ☑
14.	Main Input	🌐 Dual Link DVI Input Card, Slot 1 Input 1 ▾
15.	Secondary Input	🌐 Dual Link DVI Input Card, Slot 1 Input 1 ▾
16.	Display 3D Message Boxes	🌐 ☑

FIGURE 3-15 3D MENU

3D State: Informs you what state the projector is in: Off, Missing Secondary Signal, Not Frame Locked, Secondary Frequency Mismatch, High Bandwidth Not Supported, Stereo Sync Not Detected, Stereo Sync Invalid, and Invalid Frequency. **NOTE:** *This is read only.*

3D Mode: Select the mode of your 3D operation.

Off: 3D operation is disabled.

Native: All content is shown at a native frame rate of 96 - 120 Hz input and output.

Frame Doubled 3D: 3D Content from a single 48-60Hz signal (24/30Hz per eye) are displayed twice to provide a 3D content to be viewed at 96-120Hz.

Dual Input 3D: Content from two independent 48-60Hz 'passive' frame locked sources are interleaved into a native 96-120Hz native frame rate. This requires and optional input module and both signals must be from the same signal type.
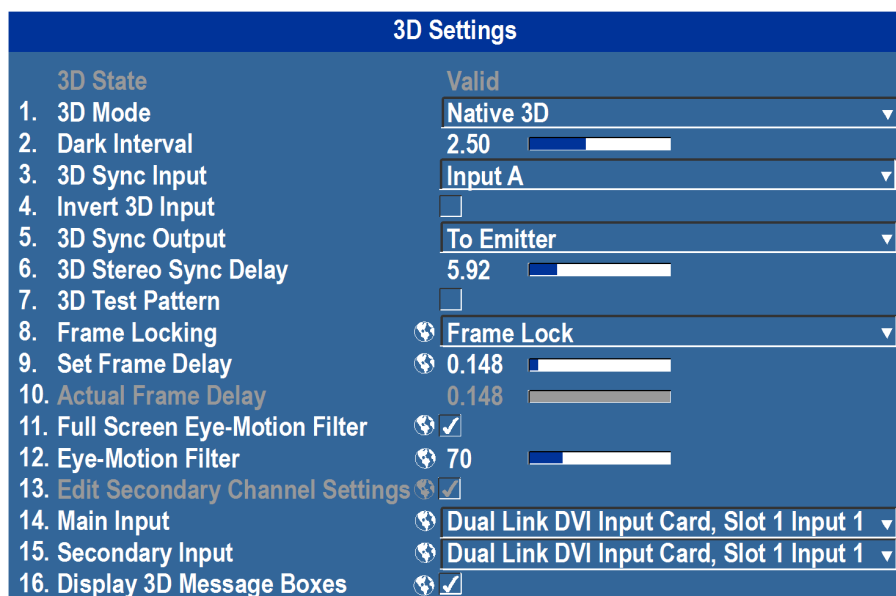
Dark Interval: Artificially increases the amount of dark time between displayed frames for stereoscopic 3D images. Higher settings provide more time for shutters in 3D glasses to open and close, ensuring that each eye sees the full display intended for it. Symptoms of cross talk or color artifacts can indicate the need for adjustment. The Dark Interval range of adjustment depends on the vertical frequency of your source-the higher the frequency, the smaller the range. Default setting is 2.5mS.

3D Sync Input: The 3D sync signal is generated by the 3D source to insure left/right eye content is synchronized to the projector and you. The projector has the ability to physically connect to two different sources. Ensure that the correct 3D sync input is selected (either Input A or Input B) with each 3D signal source. If none/internal is selected the projector will generate the sync internally and content will be displayed; however, there is a 50% chance that the content will be displayed with the left/right eyes swapped (from the remote, press FUNC 6-9 to swap the eyes). **NOTE:** *This function is not used in Interleaved 3D mode. Each eye receives a selected input and no 3D sync input is required.*
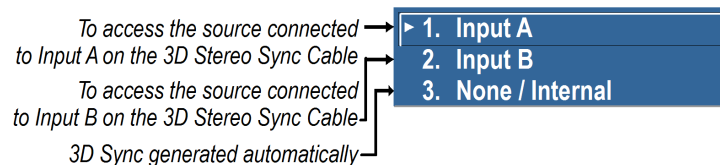
3D Sync Output: This option defines whether the 3D Sync is output and controls how it is processed. It is only valid when an optional cable is used to connect stereo 3D signals to the projector via the GPIO port. When there is no 3D signal, Sync Output should be '**Off**'. Typically only the last projector in the 3D Stereo cable chain is connected to the emitter and should specify '**To Emitter**'. All other projectors should select '**To Next Input**' if other projectors are used in the chain.
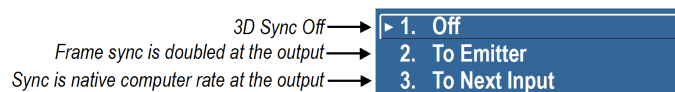
3D Stereo Sync Delay: Adjust the output 3D emitter delay (in milliseconds) to match the active glasses to the L/R frames of the projector. Proper adjustment of this delay will eliminate cross talk and odd colors caused by timing differences between the glasses and the projected image. Your specified delay is added after sync locking.

3D Test Pattern: Enables a 3D test pattern for diagnostics. The scrolling diagonal lines indicate how well left and right are synchronized. If ghosting is occurring the input may have to be switched or inverted. Adjustments to the emitter delay can also help correct the synchronization. To verify that your 3D is setup correctly, a small set of "L"s will be visible when you close your right eye and a small set of "R"s will be visible when you close your left eye.

Frame Locking: Enable or disable Frame Lock. When set to Frame Lock, if possible output image frames are locked to the input. When Locked, the output is always locked to the primary input and never the secondary image, when using Dual input 3D. Free Run sets the output to close to 60Hz for all sources. This control must be set to locked if a 3D-Stereo signal is used.

> ▸ 1. Free Run
> 2. Frame Lock

Set Frame Delay: Delays the output signal timing relative to the input signal timing by a fraction of a frame, and up to several frames. The minimum latency can vary based on the amount of scaling applied to the image. When using keystone or warping, an additional latency is required, depending on the amount of warp. The control is only available when the input signal is frame locked. In free run mode, or in cases where the signal cannot be frame locked, the minimum latency defined by the scaling and keystone/warp is applied to the signal.

Actual Frame Delay: Displays the actual frame delay reading.

Full Screen Eye-Motion Filter: Check this control to apply the Eye-Motion Filter to the entire screen, rather than applying just to the edge blending regions. Helps with posterization effects, sometimes seen in color ramps when viewing stereoscopic images.

Eye-Motion Filter: Adjust this filter to reduce saccadic eye-motion artifacts, sometimes noticeable in edge blending regions. Too much filtering may result in loss of detail. For best results, adjust this setting while positioned at the nominal screen-viewing distance.

Edit Secondary Channel Settings: When using Dual Input 3D, this allows you the option to independently control primary and secondary channel settings, or to use the same setting for both links. By default, this control is unchecked, meaning any settings applied to the primary input will also be applied to the secondary input. In this case, the secondary channel settings cannot be set. When checked, the secondary channel settings become editable.

Main Input: Select an input from the drop-down list.

Display 3D Message Boxes: Enable/Disable message boxes that are triggered by 3D setup. **NOTE:** *No message box is shown in "Off" and "Valid" state*.

3.4.3 Example of 3D Multiple Display Setup

The following instructions is an example of a multiple display setup.

1. Setup the projector's warp and blends.

2. If necessary, shift or scale your image to fit the display.

3. Set all projectors to the largest minimum Frame Delay value that the worst case projector in the array can achieve.

4. Enable 3D mode on all projectors. Using the remote >**Main Menu**>**Image Settings**>**Advanced Image Settings**>**3D Settings**

5. Set all projectors 3D Sync Output to "**Next Projector**" with the exception of the last projector; select "**To Emitter**."

6. Connect the PC emitter sync to either **Input A** (or B) on the 3D dongle.

7. Connect the output from the 3D dongle in the first projector to **Input A** (or B) on the next projector in the array.

8. Repeat the same procedure to all projectors except the last projector in the array. Route the Sync output from the 3D dongle to the emitter. **NOTE:** *For the last projector, route the sync input.*

9. If your emitter has a reverse setting ensure it is set to the Off position.

10. Set all projectors to **3D Sync Input A** (or B) depending on your selection in Step 6 & 7.

11. Apply the 3D test pattern to all projectors.

12. Put on your 3D glasses.

13. When 3D is setup correctly, a small set of L's are visible by closing your right eye and a small set of R's are visible when closing your left eye.

14. If necessary, adjust the dark interval settings until the test pattern sees the least amount of ghosting for each projector.

15. Adjust the 3D Sync Delay on the last projector in your array to match the optimal sampling point for the glasses being used. **NOTE:** *The default auto setup value is typically good for all glasses.*

16. Turn off the 3D test pattern on each projector. Your 3D content should look optimal.

4 Maintenance

Installers, service trained operators and all other users must maintain a safe operating environment at all times. Read through this section in its entirety and understand all warnings and precautions before attempting to operate this projector.

4.1 Maintenance of the Cooling System

The high-intensity lamps and electronics rely on a properly functioning cooling system. Regular maintenance of the cooling system is critical to prevent overheating and sudden projector failure and helps ensure reliable operation.

4.1.1 Ventilation

Vents and louvers in the projector covers provide ventilation, both for intake and exhaust. Never block or cover these openings. Do not install the projector near a radiator or heat register, or within an enclosure. To ensure adequate airflow around the projector, with a minimum clearance of 25cm (10") on the left, right and rear sides of the projector from any walls or other obstructions. **NOTE:** *Do not obstruct the air exchange to the projector.*

4.1.2 Optional Filters

⚠ **WARNING**   Use only special, high efficiency Christie approved filters.

⚠ **WARNING**   This projector is not equipped with fan finger guards. Keep fingers away from the fan blades when replacing filter.

Dust Air Filter

CHECK: Monthly

Check projector air dust filters, at minimum, <u>every month</u>.

Dust air filters (if fitted), should be replaced whenever the lamp is replaced or between 200-500 hours, depending on use. A clogged air filter reduces air flow and can lead to overheating and failure of the projector. Check monthly by inspecting its color through the side vent grille with a flashlight. Replace grey colored filters. Leave the filters in their sealed packaging until ready for use.

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Replace Filters:

1. Unscrew the 2 captive screws at the top of each filter door (Figure 4-1). Allow the door to rest down and away from the projector.

2. Slide the air filter out and replace, vacuum or wash the filter. Wash using mild soap and water. **NOTE:** *Dry the filter before using.*

3. Insert the new or cleaned air filter(s).

4. Secure the filter door by tightening the 2 captive screws loosened in Step 1.

Remove Screws
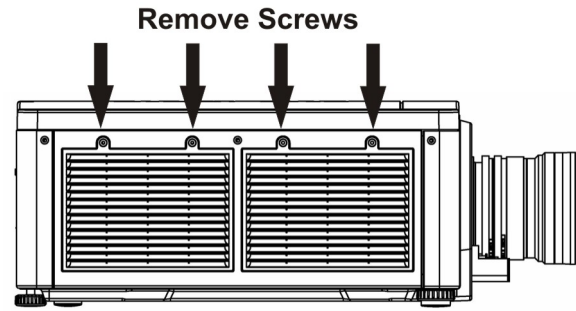
FIGURE 4-1 REPLACE FILTER

Fog Filter

Fog filters should be replaced after each use of the projector to a maximum of 20 hours. The life of the filter is approximately 20 hours based on environmental conditions. Leave the filters in their sealed packaging until ready for use. **NOTE:** *The fog filters cannot be re-used or they will clog up with oil and the projector will overheat and shutdown.*

Replace Filters:

1. Unscrew the 2 captive screws at the top of each filter door (Figure 4-1). Allow the door to rest down, away from the projector.

2. Slide the filter (or dust air filter, if fitted) out.

3. Insert the new air fog filter with ensuring the white layer facing into the projector. **NOTE:** *Each filter is a two-stage filter; the black activated charcoal layer faces out, and the white layer faces the projector.*

4. Secure the filter door by tightening the 2 captive screws loosened in Step 1.

4.2 Maintenance of Optics

DANGER
Always power down the projector and disconnect all power sources before servicing or cleaning.
Il faut toujours éteindre le projecteur et débrancher l'appareil de la prise avant l'entretien ou le nettoyage.
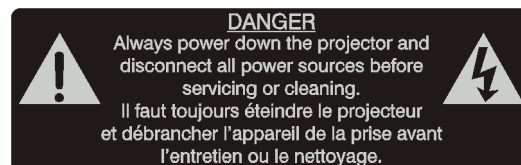
4.2.1 Optical (Excluding Lens)

Unnecessary cleaning of optics, increases the risk of degrading delicate coatings and surfaces. Only clean optics when dust, dirt, oil, fingerprints or other marks are obvious and are causing performance problems. Maintenance of optical components requires a qualified service technician. Inspect exposed optical surfaces periodically in a clean, dust-free environment using a flashlight. **Never touch** an optical surface with your bare hands. Always wear latex lab gloves.

Supplies or Cleaning Optical Surfaces

- Soft camel-hair brush
- Dust-free blower - filtered dry nitrogen blown through an anti-static nozzle.
- Dust-free lens tissue, such as Melles Griot Kodak tissues (18LAB020), Optowipes (18LAB022), Kim Wipes or equivalent
- *For lens only.* Lens cleaning solution, such as Melles Griot Optics Cleaning Fluid (18LAB011) or equivalent.
- Cotton swabs with wooden stems only
- Lens cleaning cloth/microfibre, such as Melles Griot (18LAB024) or equivalent

4.2.2 Cleaning the Lens

Check periodically. A small amount of dust or dirt on the lens has minimal effect on image quality. To avoid the risk of scratching the lens, **clean only if absolutely necessary.**

Dust:

1. Brush most of the dust from the lens with a camel-hair brush and/or blow dust away with a dust-free blower.

2. Fold a microfibre cloth smooth and gently wipe remaining dust particles from the lens. Wipe evenly with the smooth portion of the cloth that has no folds or creases. Do not apply pressure with your fingers - use the tension in the folded cloth itself to collect dust.

3. If significant dust is still bound to the surface, dampen a clean microfibre cloth with coated optics cleaning solution (damp, not dripping). Wipe gently until clean.

Fingerprints, smudges, or oil:

1. Brush away most of the dust with a camel-hair brush and/or blow away using a dust-free blower.

2. Roll a lens tissue around a swab and soak it in coated optics cleaning solution. Tissue should be damp, but not dripping.

3. Gently wipe the surface using a figure-8 motion. Repeat this motion until the blemish is removed.

4.3   Replacing the Lamps

⚠️ 💥 **DANGER: LAMPS MAY EXPLODE-POSSIBLE BODILY HARM OR DEATH**
The lamps are under pressure and may explode causing physical injury and/or property damage. Allow the lamps to cool before handling or unplugging the projector. Lamp replacement to be done by qualified service personnel; consult *User Manual* or lamp kit for instructions.

1. **To turn off the lamps:**

   Turn off the lamps using the remote keypad or the built-in keypad with the lamp **OFF** command (see Step 5) or by opening the lamp door. **NOTE:** *The lamps will turn off automatically when the lamp door is open.*

2. **To open the lamp door:**

   Using a Phillips screwdriver turn the 1 captive screw on the lamp door counter-clockwise to access the lamp compartment. **NOTE:** *When the door is open, the lamps will shut off.*

3. **Wait**

   Wait at least 10 minutes before handling the lamps, to allow the lamps to cool.

Remove Screw

FIGURE 4-2 REPLACE LAMP

4. **Remove the old lamp.**

   a. Unscrew the 3 captive screws securing the lamp using a #1 Phillips screwdriver.

   b. Carefully remove the lamp from the projector. Place the old lamp in a location where it cannot fall or be bumped.

   ⚠ **WARNING**   Handle lamps with extreme caution. Dispose of lamps according to safety regulations for your area.

5. **To use lamp OFF command:**

   a. In the lamp menu, select **CHANGE LAMP**. This will prompt for the old lamp serial number (if it was not previously entered).

   b. Enter the new lamp serial number.

   NOTE: *This action is not mandatory, it is recommended for accurate lamp statistics to be archived.*

6. **Install the new lamp:**

   a. Take precaution to align the new lamp properly in the correct orientation inside the projector.

   b. Press firmly to seat the lamps, ensuring the lamp is secure.

   c. Using the Phillips screwdriver and captive screws secure the lamp door and tighten the captive screw.

   NOTES: 1) *If the lamps were turned off with the* **OFF** *command in step 1, they will have to be manually turned on.* **2)** *If the lamps were turned off by opening the door, then they will automatically turn on again when the door is closed.*
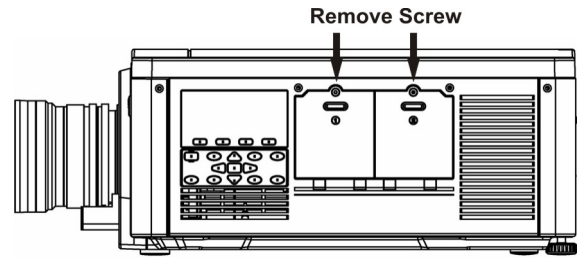
5 Troubleshooting

If the projector is not operating properly, note the symptoms and use this section as a guide to resolve the problem. If the problem cannot be resolved. contact your dealer for assistance. **NOTE**: *A Christie accredited service technician is required when opening an enclosure to diagnose any "probable cause".*

5.1 Power

5.1.1 Projector Does Not Power ON

1. **Ensure projector is plugged in?** Check power switch above power cord is in the ON position.
2. **Check that the Status LEDs are ON.** While the projector is busy initializing, the LEDs should be cycling. When finished initializing, the Power and Shutter LEDs (the two on the right) should be on.
3. **Check the LCD display.** While the projector is busy initializing, the display should show "Please wait". When finished initializing, the display should show "Standby mode".
4. Check the LCD display for any warnings or errors.

NOTE: A condition occurs on the first power on after a software upgrade, and is indicated by all the following:

• The Status LEDs are cycling green
• The LCD displays the warning "Image Processor Upgrading"
• The LED on the Image Processor card flashes green
• The Web page shows a warning that the Image processor card is upgrading.

When this occurs, the projector should not be AC power cycled and the Image Processor card should not be removed. This operation may take as long as 5 minutes to complete.

5.2 Lamp

5.2.1 Lamp Does Not Ignite

1. **Is there an interlock failure?** Check the LCD display for an error. If the other lamp has ignited and an image can be seen, use the remote keypad and check the **Status** menu for any errors and for the Lamp door interlock status. If not lamp has ignited, use the Virtual OSD on the web interface to check these items. The interlock failure could be an open lamp door or a failed lamp fan.
2. Using the remote keypad or Virtual OSD as above, check the lamp mode in the **Lamp** menu. This may be set to a single lamp or dual lamp mode. Check in the **Status** menu what the reported mode is.
3. For suspected communication failures, power-down the projector and try again.
4. If the lamp does not ignite after the second attempt and after powering down and up again (complete AC power down, then replace the lamp.

5.2.2 Lamp Suddenly Turns OFF

1. Check lamp power through the remote keypad checking the **Lamp** menu or from the web user interface **Advanced: Lamp** menu. Try increasing lamp power.

2. Check for an alarm condition on the LCD keypad display.

3. Replace the lamp.

5.2.3 Flicker, Shadows Or Dimness

1. Check lamp power through the remote keypad checking the **Lamp** menu or from the web user interface **Advanced: Lamp** menu. Try increasing lamp power.

2. Replace the lamp.

5.3   LCD

5.3.1 Blank Screen, No Menu Displaying

1. Press any arrow key on the built-in keypad. The backlight on the LCD and the backlight for the built-in keypad should turn on. If the LCD is still blank, restart the projector.

5.4   Remote Keypad

5.4.1 Remote Keypad Does Not Seem to Work

1. Replace the batteries.

2. Check if IR signals are received by the projector. Pressing any key on the remote control towards the front or rear sensor, the Status LED will blink, regardless if any command is executed. If the LED does not blink, restart the projector.

3. Ensure the remote keypad is enabled. If the projector is powered, using the built-in keypad, open the OSD menu and go to the Main Menu>Configuration>Communication submenu and check the check boxes for Front IR Enabled and Rear IR Enabled are checked. Enable them if they were disabled and try again.

4. Projector is busy. If the projector is busy in a warm-up mode or in a cool-down mode, the commands from the remote keypad may be ignored. Wait until the projector reaches a stable state (Power ON or Stand By) and try again.

5. Press the PROJ key on the remote keypad. If this brings up a pop-up box on the OSD, ensure that the check box is marked to enable the projector.

6. Using the XLR connector, use the remote as a "wired" keypad. If it does work and all the IR sensors have been enabled, then there may be a problem with the IR sensors.

5.5 OSD

5.5.1 The OSD Menu does not display

1. Using the LCD, ensure that OSD menu is enabled, scroll-down until the item OSD appears. The LCD shows "OSD: off". Press and hold the OSD soft key on the built-in keypad. The LCD now shows "OSD on" then press the menu key on the remote keypad.

   OR

2. Press and hold the OSD key on the remote keypad for 2-3 seconds, then press the menu key.

5.6 Ethernet

5.6.1 Trouble Establishing Communication with Projector

1. Ensure any address changes have been saved, and reboot to implement. If you still have trouble establishing communications with a projector added to an existing Ethernet network, the projector's IP address is likely in conflict with another address already in use. Contact your network administrator.

2. Ensure Ethernet settings are valid for the site. All devices should have the same subnet mask yet unique IP addresses.

5.7 Displays

5.7.1 The projector is on but there is no display

1. Was a lens cover accidently left on? Remove lens cover.

2. On the LCD display, check that the shutter is open. This will also be indicated by the shutter LED being green.

3. Is the correct input selected. Check cable connections.

4. Check if menus appear on the screen.

5. Can you access test pattern? Ensure a full black test pattern has not been selected for display, press Menu to access test patterns, then cycle patterns with keys. Check your source connections again.

5.7.2 Severe Motion Artifacts

1. Most likely there is a synchronization problem with reversed 3-2 pull-down in 60Hz-to-24Hz film-to-digital conversion in your source. Correct at the source.

2. Set the projector to run in Free run. Open OSD menu and go to Input Switching & PIP. Ensure that running mode is set to Free run not to Frame Lock.

3. Display a test pattern on the screen, pressing the Test button on the remote keypad. The test pattern should be displayed correctly. If not, contact your dealer for assistance.

5.7.3   Image Appears 'Squeezed' or Vertically Stretched into Center of Screen

1. Run auto setup, pressing Auto button on the remote keypad.

2. Check your Resizing selection.

5.7.4   The Display is Jittery or Unstable

1. If the display is jittery or blinking erratically, ensure that the source is properly connected and of adequate quality for detection. With poor quality or improperly connected source, the projector will repeatedly attempt to display an image, however briefly.

2. The horizontal and vertical scan frequency of the input signal may be out of range for the projector. Refer to *Section 6 Specifications* for scan frequency ranges.

3. The sync signal may be inadequate. Correct the problem at the source.

5.7.5   The Display is Faint

1. Brightness and/or contrast and/or gamma may be set incorrectly.

2. The source may be double terminated. Ensure the source is terminated only once.

3. The source (if non-video) may need a different sync tip clamp location.

5.7.6   The Upper Portion of the Display is Waving, Tearing or Jittering

This can occur with video or VCR sources. Check your source.

5.7.7   Portions of the Display are Cut Off or Warped to the Opposite edge

Resizing may need adjustment. Adjust until entire image is visible and centered.

5.7.8   Display Appears Compressed (Vertically Stretched)

1. The frequency of the pixel sampling clock is incorrect for the current source.

2. Sizing and positioning options may be adjusted poorly for the incoming source signal.

3. Use an anamorphic lens for typical HDTV and anamorphic DVD sources that have been re-sized and vertically stretched, via 3rd-party software.

5.7.9   Data is Cropped from Edges

To display the missing material, reduce image size to fill the display area available in the projector, then stretch vertically to fill the screen from top to bottom. Add the anamorphic lens to regain image width.

5.7.10 Display Quality Appears to Drift from Good to Bad, Bad to Good

1. The source input signal may be of low quality.

2. The H or V frequency of the input may have changed at the source end.

5.7.11 Display has Suddenly Frozen

If the screen blacks out inexplicably, it is possible that excessive voltage noise on the AC or ground input has interrupted the projector's ability to lock on to a signal. Power down the projector and disconnect from AC. Then plug in again and power up as usual.

5.7.12 Colors in the Display are Inaccurate

1. The color, tint, color space and/or color temperature settings may require adjustment at your input source.
2. Try Auto Setup.
3. Ensure signal connections are correct.
4. Ensure the proper channel for this source is being used.

5.7.13 Display is Not Rectangular

1. Check leveling of the projector. Ensure the lens surface and screen are parallel to one another.
2. Is the vertical offset correct? Make the necessary adjustments to the vertical offset on the lens mount.

5.7.14 Display is "Noisy"

1. Display adjustment at the input source may be required. Adjust pixel tracking, phase and filter. Noise is particularly common on YPbPr signals from a DVD player.
2. Ensure the video input is terminated (75 ohms). If it is the last connection in a loop-through chain, the video input should be terminated at the last source input only.
3. The input signal and/or signal cables carrying the input signal may be of poor quality.
4. If the distance between the input source device and the projector is greater than 25 feet, signal amplification/conditioning may be required.
5. If the source is a VCR or off-air broadcast, detail may be set too high.

5.8 Web Interface

5.8.1 After upgrading the projector software, the Web pages do not display correctly

1. After upgrading, the temporary internet files and cookies must be cleared from the Web Internet Browser to ensure that Web UI changes can take effect.

2. Using the Internet Explorer menu bar, select **Tools**> **Internet Options.** Click **Delete** from the **Browsing history** option. Click **Delete files**. Once the Delete Files window displays, click **Yes**. Then click **Delete cookies**. Once the **Delete Cookies** window displays, click **Yes** then click Close. Click **OK** to close the **Internet Options** window.

3. Close the browser and re-open before connecting to the projector.

5.8.2 Menu functions are not active

Ensure the connection of the GPIO 3D cable is connected and secure.

5.8.3 A backup or Interrogator file cannot be saved

After performing a backup of Interrogator, you may be prompted from a pop-up window before saving the file. If you have not specifically set Internet Explorer to automatically open/save the file without prompting, and if pop-up windows have been disabled (by enabling the pop-up blocker), then you will not be able to save the file.

Disable the pop-up blocker from **Main**>**Tools**>**Pop-up Blocker**. **NOTE:** *Different types of toolbars have the potential to block pop-ups.*

OR as shown in *Figure 5-1:*

1. Using the Internet Explorer menu bar, select **Tools**>**Internet Options** to open the Internet Options window.

2. Select **Internet**, then click **Custom Level** to open the **Security Settings-Internet Zone** window.

3. Scroll down the list until you see "Downloads" option setting. Ensure the "**Automatic promting for file downloads**" and "**File Download**" options are **enabled**, then click **OK**. Once the **Warning** window displays, click **OK**.

4. Using the Internet Option window, select **Local intranet**, then click **Custom Level**. Repeat Step 3.

FIGURE 5-1
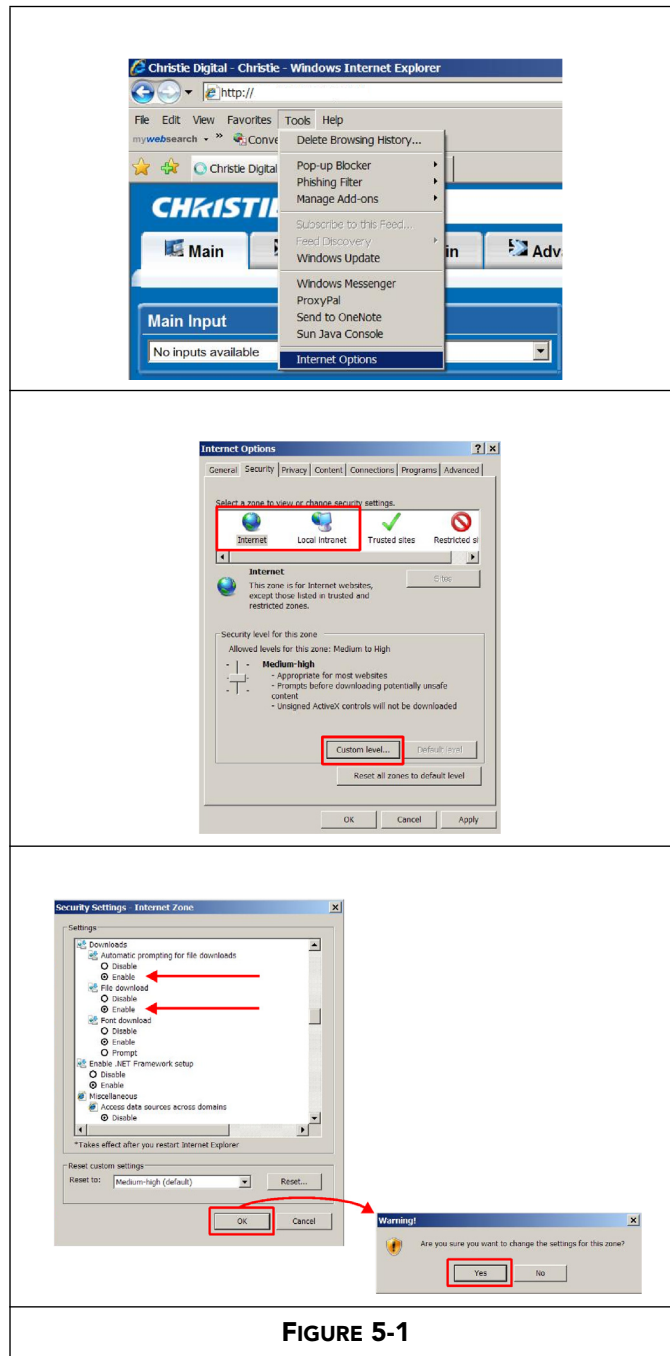
6 Specifications

This section provides detailed Mirage M Series features; including inputs, lamp, and power requirements.

NOTE: *Due to continuing research, detailed features are subject to change without notice.*

6.1 Image Performance

6.1.1 Pixel Format

HD (1920x1080p) (H x V square pixels)	1920 x 1080
SXGA+ (H x V square pixels)	1400 x 1050
WUXGA (H x V square pixels)	1920 x 1200

6.1.2 Brightness (ANSI Lumens)

Projector Model	Lamp Mode	Brightness (ANSI)
Mirage DS+6K-M	Dual	6300
Mirage DS+10K-M	Dual	10,500
Mirage HD6K-M	Dual	6000
Mirage HD10K-M	Dual	10,000
Mirage WU7K-M	Dual	6300
Mirage HD12K-M	Dual	10,500

6.1.3 Contrast

ANSI: 16 pt. checker pattern on black screen	650:1 typical
Full field: 9 pt. average ON/OFF with background light subtraction	2500:1 typical (full open aperture) HD (1920x1080p) 2100:1 typical (full open aperture) SXGA+ 2100:1 typical (full open aperture) WUXGA
Manual adjustable or Dynamic Iris	up to 10000:1 typical (with a closed aperture) **NOTE:** *Dynamic Iris is only used on the Mirage for Home Theater applications. Manual Iris is most often used for fixed installations.*

6.1.4 Luminance Uniformity

Dual lamp Full white ANSI 13-pt. (w/o electronic corr.)	+15%, -25%
Single lamp Full white ANSI 13-pt. (w/o electronic corr.)	+25%, -35%
Full white ANSI 13-pt. (w/ electronic corr.)	+5%. -5%
Full black ANSI 13-pt.	Negative uniformity shall be between -35% and 0% and positive uniformity shall be between 0% and +35%.

6.1.5 Color Uniformity

Full white ANSI 13-pt.	±0.005 cluster on u',v' chart (CIE 1976)
Full black ANSI 13-pt.	±0.075 cluster on u', v', chart (CIE 1976)

6.1.6 Color Primaries

ANSI 9 point measurement	x	y
Red	0.665 ± .025	0.335 ± .025
Green	0.343 ± .040	0.640 ± .040
Blue	0.145 ± .020	0.050 ± .025
White	0.300 ± .050	0.300 ± .050

6.1.7 Gamma

Default Gamma (all points from 10 to 90 IRE)	2.2 + linear segment
Adjustable Gamma range	1.0 to 3.0

6.1.8 Grayscale/Color Resolution

Resolution	10 bits (non-linear) min. (Gamma encoded)

6.1.9 Color Temperature

White Default CCT	7700K ±2000K 350W Lamp
	8900K ±2000K 200W Lamp
Range of Adjustment	3200 K - 9300 K
Tracking (deviation from normal over full range from 10 – 100 IRE)	±500 K max
Stability (during rated lamp life)	±500 K max

6.1.10 Convergence

Convergence zones A, B, C are as defined in Figure 2. Zone A has a diameter ¼ of the image height. Zone B has a diameter of full image height. All specified convergence errors are between any two colors after a minimum warm-up of 30 minutes.

Convergence is specified with a 1.4-1.8 HD lens (part number 118-100112-01) in the 1.4:1 position with zero offset. Bore-sight alignment must be adjusted for zero angular error. (**Note**: convergence error includes the effects of lateral color in the projection lens. Measurements must be done on horizontal and vertical test pattern lines that intersect the center of the image).
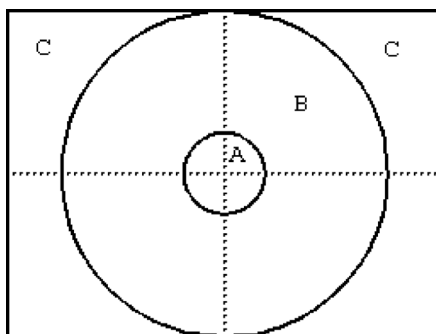
(Figure applicable to both HD (1920x1080p) and SXGA+)

Measurement Area	Maximum Convergence Error (Pixels)
Zone A	1/4
Zone B	1/2
Zone C	3/4

6.1.11 Blemishes

Blemishes are to be observed at 1 full screen height distance from the image for a period of 30 seconds. Screen size: 10 foot wide for 350W models, 8 foot wide for 200W models. Blemishes are defined as per TI Specification 2506811.

Red screen	No blemishes
Green screen	No blemishes
Blue screen	No blemishes
White screen	No blemishes
Black screen	No blemishes

6.1.12 Pixel Defects

Red	0 bright, 1 dark
Green	0 bright, 0 dark
Blue	0 bright, 2 dark non-adjacent

6.1.13 Image Artifacts

Evaluate on multi-burst or fine grid test pattern	No visible artifacts with observer at 1 full screen height from image

6.1.14 Picture Centering (with 1.4-1.8:1 HD lens)

HD (1920x1080p) centering error	±5% of vertical offset (±32 pixels)
SXGA+ centering error	±5% of vertical offset (±26 pixels)
WUXGA centering error	±5.5% of vertical offset (±32 pixels)

6.2   Feature Set

6.2.1   Airflow

Air intakes	Right side of projector
Air exhaust	Hot lamp exhaust: rear of projector
	Cool light engine exhaust: left side of projector

6.2.2   Air Filters (Optional)

Filter media types	Coarse foam filter
	Fog filter
Filter access	Service-interchangeable via access panel

6.2.3   Dust Sealing

Dust sealed DMDs	Gasket sealed
Dust sealed illumination system	Sealed from lamp input to entrance face of prism when lamps are installed

6.2.4   ILS (Intelligent Lens System)

Motorized lenses and lens mount with position encoding	Zoom, focus, horizontal and vertical offsets
Accuracy	±2 pixel
Manual control	1/3 pixel fine movement control per button press on any applicable User Interface (e.g., remote).
Calibration	Automatic calibration on lens change detection
User Configurable Calibration Modes	Automatic calibration on power-up
	Manual calibration
Calibration time	< 10 secs when required
Bore sight	3-point +- 4 degrees adjustment and lockable without removing covers
Travel time to stop	
Zoom and Focus	10 sec nominal (depends on lens type)
Offsets	5 sec (nominal (depends on lens type)
Manual Lens Movement	Manual over-ride permissible for zoom and focus

6.2.5   Projection Lens Compatibility

Lens type	Reverse Telecentric Internal-focus
	Motorized zoom and focus with position feedback

NOTE: *Calculated Throw distance values are subject to a ±5% lens tolerance*

Lens Throw Ratio

	Lens Description	Part Number	WUXGA Throw Ratio
Fixed	Lens ILS 0.73:1SX+/0.67:1HD	118-100110-xx	0.67
	Lens ILS 1.2SX+/1.1HD	118-100117-xx	1.1
Zoom	Lens ILS 1.25-1.6SX+/1.16-1.49HD	118-100111-xx	1.16-1.49
	Lens ILS 1.5-2.0SX+/1.4-1.8HD	118-100112-xx	1.4-1.8
	Lens ILS 2.0-2.8SX+/1.8-2.6HD	118-100113-xx	1.8-2.6
	Lens ILS 2.8-4.5SX+/2.6-4.1HD	118-100114-xx	2.6-4.1
	Lens ILS 4.5-7.5SX+/4.1-6.9HD	118-100115-xx	4.1-6.9
	Lens ILS 7.5-11.2SX+/6.9-10.4HD	118-100116-xx	6.9-10.4

6.2.6 Iris

Motorized iris with position feedback	Scene controlled motorized iris automatically adjusts to image content
Max frequency open-close-open	20 Hz
Sound level	Within ambient noise level of projector Configurable per channel

6.2.7 Automatic Fans

Temperature sensitive fan speed control	Fans automatically adjust to required speed to maintain projector at proper operating range as function of outside ambient temperature
Standby	All fans are off when projector is in standby and not running active loop-through on a Twin HDMI option card
Temperature range for variable fan speed	5 to 40 degrees C
Transition steps	Smooth speed transitions with no abrupt audible changes

6.2.8 Constant Lamp Output Management

LiteLOC™	Automatically adjusts lamp output to maintain constant lumens setting within operating range of lamp.

6.2.9 Shutter

Open	Light transmitted to projection lens
Closed	All light blocked - no light on screen
Activation	Operation in less than 0.25 seconds.

6.2.10 Lamps

Dual Mercury lamp system   Lamps are accessed from side of projector
                 Lamps are individually swappable while the
                 projector is running

6.2.11 Status LED

Status LED's   Located at back of projector
              LED STATES
Lamp 1, Lamp 2   **Off** – Lamps are off
         Yellow – Lamp time has expired and lamp should be replaced
         Green – Lamp is on and operating correctly
         Flashing red – Lamp has malfunctioned

Power   **Off** – AC power is off
         Yellow – AC is present but projector is in standby
         Green – Projector is powered up and operating normally
         Flashing green/yellow – Projector communication in progress
         Flashing red – Error has occurred. Details are displayed on the status display

Shutter   **Green** – shutter is open
         Yellow – shutter is closed

6.2.12 Electronics/SW

FEATURE	COMMENTS
Video Format Re-Sizing	All video formats can be resized to fill screen either horizontally or vertically while maintaining aspect ratio
Picture in Picture	
Seamless Switching	
Built-in 2D keystone and geometry correction	
Auto-scaling	
Auto-de interlacing	
Edge blending	
Warping	
Tiling (support for up to 3x3 arrays)	
Blanking and Image positioning	
Brightness, contrast, color, and uniformity user settable control	
Image orientation	Can display image front/rear, normal/inverted (ceiling)
Electronics HW access	All accessible electronics are mounted from the back of the projector
Number of option cards	6 user inter-changeable – hot swappable
Number of processor cards	2 user inter-changeable
Number of option slots	4, located at back of projector for option cards; 1, located at back of projector for processor card
Native format adjustment	Optional global aspect ratio setting can be set for projector allowing for automatic scaling of all input images to required output format
Arbitrary Gamma	User definable gamma curves

6.3   Image Processor Performance

Min input pixel rate	13 Mpix/s	
Max input pixel rate	330MHz	Over dual link DVI-D
Max input resolution	2048x1536 (QXGA)	
Min input resolution	640x400	
Max input frame rate with Standard Image Processor Card	59Hz at 2560x1600 (QXGA) *	* With sources that can output minimum blanking, otherwise lower vertical rates
Processing	10 bit throughout *	* Except Dual-DVI input in dual-link mode (dual 8 bit input paths into 10 bit processing)
Source switching time	Seamless switching with switch time less than 1 second	

6.4   Input (Source Signal) Compatibility

6.4.1   Analog (Only) Input

Connectors	5 female BNC, 75 Ohm R/Pr G/Y B/Pb H/C V
Color spaces/signal types	RGB YPbPr
A/D conversion	10 bits

6.4.2   Twin HDMI Input

Connectors	2 independent HDMI inputs type A 2 loop-out connectors type A
Color spaces/signal types	RGB YCbCr (4:2:2) YCbCr (4:4:4) HDCP support HDMI 1.3 supported (not including audio) except: 12 bit color dithered to 10 bits; 16 bit color not supported

6.4.3 Dual Link DVI Input

Connectors	1 dual link DVI-I, 300MHz
	Supports: DVI-D (dual link), DVI-D (single link), DVI-A* (analog), DHCP (with appropriate HDMI adaptor cable)
	1 analog 15-pin VGA*
	*Supports monoscopic-only signals under 165MHz. The VGA connector can be used for Dual Input 3D mode. Only one input can be used at a time on this input module.
Color spaces/signal types	RGB, YPbPr, HDCP
A/D conversion	8 bit DVI-D, 10 bit HDMI
Frequency	330MHz, DVI-D (dual link) 165MHz DVI-D (single link) and analog.

6.4.4 Video Decoder Input

Connectors	2 S-Video 4-pin miniature DIN
	4 BNC, 75 Ohm
	2 independent decoder channels for PIP
Color space/Signal types	Composite video
	Component video (SD and ED only)
	S-video
Video Standards	NTSC, NTSC 4.43, PAL, PAL M, PAL N, PAL 60, SECAM
A/D conversion	10 bits

6.4.5 Dual SD/HD-SDI

Connectors	BNC, 75 Ohm
Color spaces/signal types	Dual HD input
	SDI, HDSDI

6.5 Control Signal Compatibility

6.5.1 Projector Control

Number of transmitters	2 IR
Modulation frequency	Dual frequency (38 kHz, 455 kHz)
Wavelength (peak intensity)	950 nm
Range	Min 35 m
Wired Keypad	
Wire connection (option)	3 pin XLR
Max cable length	30 m
XLR Connections	Optional boot for remote with XLR connector built-in to avoid requirement to use phono-to-XLR adaptor cable

6.5.2 Control Receiver

Number of sensors	1 front, 1 rear
Coverage	130 degrees coverage in-line with lens at 3 m distance
Modulation (carrier) frequency	Dual frequency (38 kHz, 455 kHz)

6.5.3 RS-232

Number of ports	2
Connector	1 female 9-pin Dsub (IN)
	1 male 9-pin Dsub (OUT)
Max bit rate	115.2 kbps
Flow control	Xon/Xoff

6.5.4 RS-422

Number of ports	1
Connector	1 female 9-pin Dsub
Max bit rate	115.2 kbps
Power output	12 V ±5% @ 400mA maximum

6.5.5 Ethernet

Number of ports	1
Standard	10/100 Base-T
Connector	Female RJ-45

6.5.6 USB 2.0 Device Port

Number of ports	1
Standard	Supports: mass storage device type, Ethernet device type, and/or serial device type.
Connector	USB type B (full size)
Max bit rate	3-12 Mbps (high speed 480 Mbps not supported)

6.5.7 GPIO

Number of I/O Lines	7
Connector	Male 9-pin Dsub
Output sink current (logic low)	100 mA @ 1V typical
Power output	12 V ±5% @ 400mA maximum

6.5.8 Built-In Keypad and Display

Key type	Soft-touch keys
Display type	Graphics LCD backlight

6.5.9 AMX/Crestron Support

AMX Device Discovery Partner
Crestron Integrated Partner

6.6 Power Requirements

Rated voltage	100 VAC – 240 VAC
Rated Current (dual lamp operation)	
370W HD(1920x1080p)	12 A @ 100 VAC
200W HD(1920x1080p)	9 A @ 100 VAC
370W SXGA+	12 A @ 100 VAC
200W SXGA+	9 A @ 100 VAC
370W WUXGA	12 A @ 100 VAC
200W WUXGA	9 A @ 100 VAC
Line frequency	50/60 Hz
AC Input Coupler	15 A, 250 VAC
Type of connector	IEC 320-C14 with wire cable clamp
Line Cord	14AWG type FT1 with plug, NEMA 5-15P, 15A
Inrush Current	60 A max

Maximum Power Consumption	Dual Lamp	Single Lamp
370W HD (1920x1080p)	1320W	831W
350W HD (1920x1080p)	1267W	805W
300W HD (1920x1080p)	1135W	739W
200W HD (1920x1080p)	871W	607W
150W HD (1920x1080p)	739W	541W
370W SXGA+	1320W	831W
350W SXGA+	1267W	805W
300W SXGA+	1135W	739W
200W SXGA+	871W	607W
150W SXGA+	739W	541W
370W WUXGA+	1320W	831W
350W WUXGA+	1267W	805W
300W WUXGA+	1135W	739W
200W WUXGA+	871W	607W
150W WUXGA+	739W	541W
Maximum Current at 100V		
370W HD (1920x1080p)	13.2 A	8.3 A
350W HD (1920x1080p)	12.7 A	8.0 A
300W HD (1920x1080p)	11.4 A	7.4 A
200W HD (1920x1080p)	8.7 A	6.1 A
150W HD (1920x1080p)	7.4 A	5.4 A
370W SXGA+	13.2 A	8.3 A
350W SXGA+	12.7 A	8.0 A
300W SXGA+	11.4 A	7.4 A
200W SXGA+	8.7 A	6.1 A
150W SXGA+	7.4 A	5.4 A
370W WUXGA	13.2 A	8.3 A
350W WUXGA	12.7 A	8.0 A
300W WUXGA	11.4 A	7.4 A
200W WUXGA	8.7 A	6.1 A
150W WUXGA	7.4 A	5.4 A

6.6.1 Lamp Specification

Type	Mercury Lamp (Hg)
Power	
200W HD/200W SX+/200W WU/200W	150 W min., 200 W max (software adjustable)
200W Lamp rated lamp life to 50% brightness	2000 hrs typical @ 200W
(2 hrs on, 15 min, off duty cycle)	3000 hrs typical @ 150W
350W HD/350W SX+/350W WU/350W	300 W min., 370 W max (software adjustable)
350W Lamp rated lamp life to 50% brightness	1300 hrs typical @ 370W
(2 hrs on, 15 min. off duty cycle	1500 hrs typical @ 350W
	2000 hrs typical @ 300W
Warm-up time (to full output)	5 minutes max
Operating position	±20 deg max tilt of lamp axis from horizontal

6.7 Physical Specifications

6.7.1 Size

Maximum product dimensions (L x W x H)	561mm (22.1") x 500mm (19.7") x 247mm (9.75")
(with lens removed)	
Maximum shipping dimensions (L x W x H)	775mm (30.5") x 698.5mm (27.5") x 584mm (23")

6.7.2 Adjustment

Product Alignment	2" of vertical adjustment on 2 front feet
	1" of vertical adjustment on single rear foot

6.7.3 Weight

Maximum product weight (with lens removed)	25kg (55lb.)
Maximum shipping weight (includes packaging)	40kg (87lb.)

6.7.4 Operating Position

Horizontal	±20 degrees allowable rotation about lens axis
Inverted	±20 degrees allowable rotation about lens axis
Rotation	±180 degrees perpendicular to lens axis

6.8 Reliability and Serviceability

6.8.1 Reliability

MTBF – excluding consumable components	15,000 hrs
Consumable components	Air filters, fans, lamps

6.8.2 Serviceability

Time to replace any option card	1 minute
Time to replace lamp	1 minute
Time to replace projection lens	30 seconds
Time to replace air filter	1 minute

6.9 Environment

6.9.1 Temperature/Humidity/Altitude

Operating temperature range	5 to 40 degrees C
Storage temperature range	-40 to 70 degrees C
Humidity range	10% to 80%, non condensing
Operating Altitude	10,000 ft. maximum

6.10 Accessories and Service Components

Product Name	Part Number	Sold With Product	Sold Separately
Dual Image Processor	108-316101-XX	X	X
Analog Input	108-309101-XX		X
Dual Link DVI Input	108-312101-XX	X	X
Dual SD/HD-SDI Input	108-313101-XX		X
Twin HDMI Input	108-311101-XX		X
DMX512 Interface	108-314101-XX		X
Air Filter Dust	118-100104-XX		X
Air Filter Fog	118-100105-XX		X
Stacking Frame	118-100107-XX		X
Ceiling Mount	118-100108-XX		X
Lens ILS 0.73:1SX+/0.67:1HD	118-100110-XX		X
Lens ILS 1.25-1.6SX+/1.16-1.49HD	118-100111-XX		X
Lens ILS 1.5-2.0SX+/1.4-1.8HD	118-100112-XX		X
Lens ILS 2.0-2.8SX+/1.8-2.6HD	118-100113-XX		X
Lens ILS 2.8-4.5SX+/2.6-4.1HD	118-100114-XX		X
Lens ILS 4.5-7.5SX+/4.1-6.9HD	118-100115-XX		X
Lens ILS 7.5-11.2SX+/6.9-10.4HD	118-100116-XX		X
Lens ILS 1.2SX+/1.1HD	118-100117-XX		X
Lens ILS 1.2SX+/1.1HD	118-101103-XX		X
Portrait Adapter	118-116109-XX		X
Module IR Keypad w/Laser	002-100005-XX	X	X
HARN Wired Keypad External	001-100704-XX	X	X
User Manual	020-100575-XX	X	
Service Manual	020-100551-XX		X
AutoSTACK	108-308101-XX		X

6.10.1 Service Components

Service Item	Part Number
Lamp (200W)	003-100856-XX
Lamp (350W)	003-100857-XX
Air Filter Dust M Series (Package of 6)	118-100104-XX
Air Filter Fog M Series (Package of 6)	118-100105-XX

6.11 Regulatory

This product conforms to the following regulations related to product safety, environmental requirements and electromagnetic compatibility (EMC).

• FCC Part 15, Subpart B Class A; CISPR22/EN55022; CISPR24/EN55024

• UL 60950-1 First Edition; CAN/CSA-C22.2 No. 60950-1-03 First edition;

• IEC60950-1:2001

• 2002/95/EC RoHS

Appendix A: GPIO

This section explains how to use a GPIO link from the projector to external equipment, such as devices for 3D synchronizing.

A.1 GPIO Port

The GPIO connector located on the input panel provides a flexible method of interfacing a wide range of external I/O devices to the projector. There are 7 GPIO pins available on the 9pin D-Sub GPIO connector, which are configurable via RS-232 commands. See *Figure A-1*. The other two pins are reserved for ground and power - see table below for pin identification.
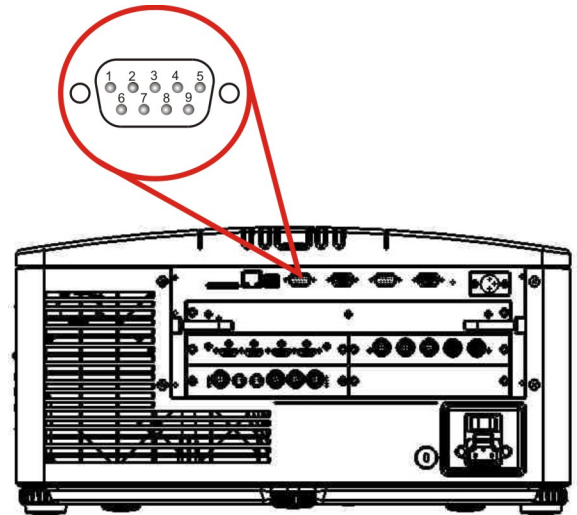

FIGURE A-1 - GPIO CONNECTOR

Table A.1 GPIO Pin

| GPIO PINS	
PIN #	**SIGNAL**
Pin 1	+ 12V (200mA)
Pin 2	GPIO 2
Pin 3	GPIO 4
Pin 4	GPIO 6
Pin 5	Ground
Pin 6	GPIO 1
Pin 7	GPIO 3
Pin 8	GPIO 5
Pin 9	GPIO 7

The serial cable required for connecting the external device to the projector's GPIO connector, must be compatible with the external device.

Configuring the GPIO

The GPIO connector can be configured to automate any number of events using the serial command code **GIO**. Each Pin is defined as either an *input* or *output* depending on the desired outcome. Configure the pin as an input if you want the projector to respond to something the device does and as an output if you want the external device to respond to an action taken by the projector. For example, configure the pin as an output if you want the lighting in a room to automatically dim when the projector is turned on.

By using the GIO command, you can also set the state of each output pin as *high* or *low*. By default, the state of each pin is *high*. The voltage applied to pins in the high state is +3.3V.

A low state (or value of 0) will be read on an input pin if the circuit attached to the pin is open. A high state (or value of 1) will be read on an input pin if the circuit attached to the pin is shorted to ground. This corresponds to a switch closing event.

Pin ⟋ Open (0 or L)

Pin Closed (1 or H)
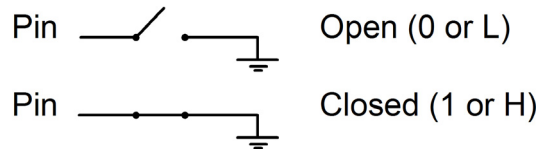
Example 1. Turn room lighting on when the projector is turned off. (*Assumes a control/automation unit is configured to turn the lights on when pin 2 of its input goes high.*)

(GIO+CNFG "OOOIIII")	*Set pin #2, 3 & 4 configuration to output and pin 6, 7, 8 & 9 to input*
(GIO+STAT "HLXXXXX")	*Set pin #2 to high, pin 3 to low and the state of all other pins unchanged*

Query Command

(GIO+STAT)	*Request the state of all pins*
(GIO+STAT "HLLHLLH")	*Reply of pin states - H means pin is high, L means pin is low*
(GIO+CNFG)	*Request the configuration of all pins*
(GIO+CNFG "IIIOOOO")	*Reply of pin configurations - pins 2, 3 & 4 are Inputs, pins 6, 7, 8 & 9 are Outputs*

NOTE: *The strings in the commands refer to pins 2, 3, 4, 6, 7, 8, 9 in order from left to right.*

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